The New England
Journal of Medicine

Copyright, 1948, by the Massachusetts Medical Society

Volume 239 NOVEMBER 25, 1948 Number 22

THE SURGICAL TREATMENT OF MITRAL STENOSIS*

I. Valvuloplasty

DWIGHT E. HARKEN, M.D.,† LAURENCE B. ELLIS, M.D.,‡ PAUL F. WARE, M.D.,§
AND LEONA R. NORMAN, M.D.¶

BOSTON

NEARLY fifty years ago the possibility of relieving the obstruction to blood flow through a narrowed mitral valve was first suggested. Subsequent attempts have been made to accomplish this.[1–16] The surgical technics employed in these bold but disappointing adventures have been variously described as valvulotomy and valvulectomy. Much of the discussion of the theoretical value of this procedure has been concerned with the problem whether the patient would tolerate a surgically induced mitral insufficiency better than his existing stenosis. This, however, is an oversimplification of the situation. Many factors produce the symptoms and determine the course of the disease in patients with mitral stenosis. Among these are not only the degree of obstruction and of insufficiency of this valve but also the tendency to tachycardia or arrhythmia and the ease of its control, associated valvular defects, the activity of rheumatic disease, the damage to the myocardium of the two ventricles and alterations, functional or organic, in the pulmonary vascular circuit. Clearly, the problem of surgery in mitral stenosis is not simply that of breaking down a barrier to the flow of blood through a stenotic orifice.

At the present time, there are technics for studying cardiopulmonary dynamics that are vastly more extensive and more accurate than those available to earlier students of this problem. They provide objective data for the evaluation of the patient before operation and the assessment of the result of surgery. In our opinion, the undertaking of surgery of such an experimental and hazardous nature in a complex physiologic situation without complete, objective studies is entirely unjustified.

It is the purpose of this first report to set forth certain preliminary impressions concerning the selection of patients for operation, the nature of the operation of choice and the surgical handling of the patient. In particular, a technic of direct valvuloplasty for mitral stenosis is presented.

Selection of Patients and Choice of Operation

In brief, patients selected for operation should give unequivocal signs of mitral stenosis, should not have any significant degree of involvement of other valves or any other type of cardiovascular disease and should not present evidence of active rheumatic carditis or bacterial endocarditis. They should not have associated disease in itself incapacitating, but should have cardiac symptoms that are disabling and intractable to medical therapy. These patients suffer from profound pulmonary symptoms in various combinations, not only dyspnea, on exertion and at rest, and orthopnea, but also paroxysmal dyspnea, pulmonary edema, hemoptysis and chest pain. They may or may not have right-sided heart failure with peripheral venous congestion, hepatomegaly and peripheral edema.

Certain basic factors involved in the physiologic state of the circulation in mitral stenosis must be considered in selecting patients for operation and in choosing the surgical procedure most likely to be beneficial. These are: the ability to maintain an adequate resting cardiac output and to increase it on exertion; the basic cardiac rhythm and the resting heart rate, the change on exertion, emotion and so forth, and the degree to which tachycardia can be controlled by medical means; the ex-

*From the Eighth Surgical Service and the Surgical Research Laboratory, Boston City Hospital, and the Department of Surgery, Tufts College Medical School.

The medical evaluation of patients and cardiac catheterization studies were carried out at the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School.

This study was supported by The Heart Institute of the Sias Laboratories, Brooks Hospital, Brookline, Massachusetts, by The Charlton Fund of Tufts College and by The Life Insurance Medical Research Fund.

†Assistant professor of surgery, Tufts College Medical School; visiting surgeon for thoracic surgery, Boston City Hospital; senior associate in thoracic surgery, Peter Bent Brigham Hospital; thoracic surgeon, Mt. Auburn and Malden hospitals.

‡Assistant clinical professor of medicine, Harvard Medical School; associate physician, Thorndike Memorial Laboratory, Boston City Hospital; assistant visiting physician, Boston City Hospital.

§Assistant to visiting surgeon for thoracic surgery, Boston City Hospital (on leave of absence); fellow in surgery, Smithwick Foundation, Massachusetts Memorial Hospitals.

¶Charlton Research Fellow in Cardiac Surgery; research fellow in heart surgery, Heart Institute of Sias Laboratories, Brooks Hospital.

tent of elevation in pressure in the left auricle and pulmonary veins at rest, during exercise and tachycardia, and the relative importance of mitral regurgitation in the increase in this pressure; the degree of right ventricular failure; and the problem of organic disease in the pulmonary circulation. Since the patients who are under discussion had clinical signs of endocarditis confined to the mitral valve alone and no evidence of active myocarditis, neither the effects of disease involving other valves nor the possibility of left ventricular failure need be considered.

With these factors in mind, a preliminary classification of patients into three groups has been made.

Group A

This group includes patients with a low resting cardiac output, which is unchanged or even decreased on exercise, and with an elevated pulmonary-artery pressure. Signs of right ventricular failure may appear in addition to the pulmonary symptoms. For such patients, the operation of "valvuloplasty" may be helpful since the available evidence indicates that mitral obstruction is of major importance in their clinical condition.

Group B

In this group are patients whose resting cardiac output is within normal limits and usually increases with exercise. In spite of the adequate cardiac output, they often have as severe pulmonary symptoms as those in Group A, and the pulmonary-artery pressure is also elevated. The pathophysiologic mechanism in these cases may be a predominance of mitral regurgitation over the element of stenosis, or it may be that a high left auricular pressure maintains flow through narrowed mitral orifices to an adequate level. Secondary organic pulmonary vascular changes may also occur as an important element in producing the pulmonary symptoms. These patients may be benefited by the production of an artificial interatrial septal defect, which will decompress the left auricle and the pulmonary venous hypertension, especially at high peaks during periods of strain. This operation is probably not suitable for patients who have had right ventricular failure because of the added burden produced in the right ventricle by the recirculation of blood through this chamber and the pulmonary circuit. Such an operation may be contraindicated for patients in Group A, in whom too great a proportion of blood may be diverted through the shunt, and with decreased left atrial pressure, blood flow through the stenotic mitral orifice would be reduced still further to a level incompatible with life.

Group C

This category includes patients whose incapacitating symptoms, particularly attacks of pulmonary edema, are associated with rapid heart action that cannot be controlled by medical measures. The cardiac output may be normal or low, and the pulmonary-artery pressure elevated; the patients are not deemed suitable candidates for either of the operations mentioned above because of the extent and severity of their disease. The occasional patient with mitral stenosis who has attacks of severe chest pain, especially "hypercyanotic angina," may also fall into this group.[17] For these patients, a palliative procedure may be the removal of the cardiac sympathetic accelerator and afferent nerves. In 2 successive operations, the inferior cervical ganglion and the first four or five dorsal sympathetic ganglions are removed from each side through a small cervical incision. The relief afforded is through the production of a slower heart rate or the interruption of pain fibers. It is also possible that some additional direct effect on the pulmonary circulation is produced. A patient on whom such a denervation was performed has had dramatic relief from attacks of pulmonary edema for eleven months.

It is likely that the eventual surgical management of mitral stenosis will include combinations of these three operations. At the present time, however, it seems safest for the patient and consistent with the clearest understanding of the potentialities of each operation to carry them out singly. Again, it should be emphasized that the evaluation of the indications for these operative procedures and of their results should be kept on an objective basis, all the investigative tools that are available being used.

We have now treated 5 patients with mitral stenosis surgically. Two of these patients have had valvuloplasty, 2 have had atrial septal defects created, and 1 has had cardiac denervation. There has been 1 death; this was the first patient on whom a valvuloplasty was performed. This case is reported in detail below. It was from our experience in this operation that we came to appreciate the devastating effects of tachycardia in the presence of mitral stenosis and regurgitation. All the other patients are living and have had subjective improvement of their symptoms. Preliminary follow-up studies in 2 cases indicate that the objective improvement is considerably less striking than the subjective benefit.

Surgery of Mitral Stenosis in the Past

During the latter part of the nineteenth century, the physiology of the circulation and of artificially produced valvular defects was the focus of some attention. The progress made in these studies culminated in the suggestion by Brunton[1] in 1902 that stenosis of the mitral valve might be relieved

surgically. Experimental support of this thesis came from the work of Haecker,[2] Bernheim,[3] and Cushing and Branch.[4] Surgical technic was studied by Schepelmann,[5] and later by Carrel and Tuffier.[6] During the decade from 1920 to 1930, clinical trial of mitral-valve surgery was made.

The most extensive experience was that of Cutler, Levine and Beck,[7-12] who operated on 7 patients of whom only the first survived. Cutler and his group attempted incision of the valve with a tenotomy knife in their first 3 operations. Further consideration of the thick, tough, calcareous valves made it obvious that incisions in the stenotic funnel were probably impossible and certainly inadequate. A cardiovalvulotome utilizing the principle of counterpressure was developed. Unfortunately, none of the patients on whom this instrument was used survived. Allen and Graham,[13, 14] Souttar[15] and Pribram[16] reported 1 case each. Of these, only Souttar's patient survived; however, he had but "dilated" the mitral ring with his finger, whereas the others had attempted incision by cardiovalvulotome.

Instruments for direct visualization and manipulation within the heart have been used in cardiac

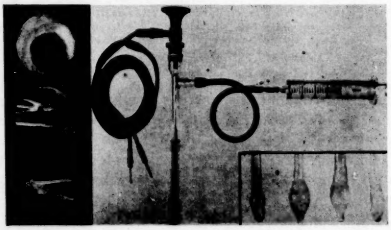

FIGURE 1. *Assembled Cardioscope, with Sketches of a Pulmonary Vein, Mitral-Leaflet Edge and Papillary Muscle, as Seen through the Instrument.*

Insert: elastic plastic, transparent balloons that fit on cardioscopic carrier. These, distended with saline solution, displace blood and allow intracardiac inspection. (Reproduced from Harken and Glidden,[18] by permission of the publishers.)

operations[13, 18] (Fig. 1), but it is our opinion that the limited vision afforded by them does not warrant the increased operative hazard. To be sure, the ultimate technic in intracardiac surgery will embrace good endoscopic visualization or the utilization of a temporary mechanical substitute for the heart and lungs, allowing direct open operation on the interior of the heart during the period of suspended function.

Basic Principles and Technic of Valvuloplasty

The efforts of Cutler and Beck at correcting mitral stenosis formed the basis of our interest in this field. Discussion of the subject with Dr. Cutler before his death made it possible to correlate his experience with our own in cardiac manipulation. The rationale for valvuloplasty was predicated on this experience[19-23] and extended as the result of our first and only fatal operation.

In their operations, Cutler and Beck[11] employed a technic in which the heart was rotated forward and outward from the position of optimum function (Fig. 2). One of us (D. E. H.) had found in

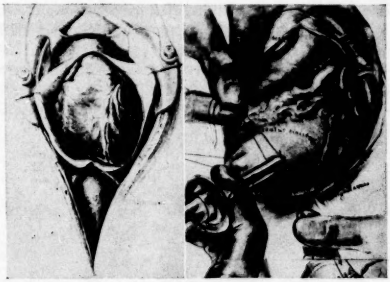

FIGURE 2. *Illustrations Demonstrating the Exposure of the Heart and the Dislocation of the Heart from the Position of Optimum Function to Introduce the Valvulotome through the Ventricle. (Reproduced from Cutler and Beck,[11] by Permission of the Publishers.)*

operating on hearts of otherwise robust American soldiers in the course of removing foreign bodies that this very sort of dislocation was invariably associated with violent disorders of rate, rhythm and output. These have been discussed in a previous publication[21] and documented in a motion-picture film in color.[24] If healthy hearts could not tolerate this dislocation, it is hardly likely that hearts damaged by rheumatism associated with far advanced mitral stenosis would fare better, much less tolerate the added insult of insertion of the valvulotome through the left ventricle. Indeed, it seems likely that a high mortality might result in these patients from dislocation of the heart alone, without any intracardiac manipulation.

The first principle is as follows: *the operation should be performed without dislocation of the heart from the position of optimum function.*

Again with the work of Cutler and Beck in mind, it was evident that it was most difficult to strike the apex of the stenotic funnel satisfactorily from

its ventricular aspect (Fig. 3). However, any instrument introduced from the auricular side tends to find the fish-mouthed opening with great ease. The objection to using the auricular appendage had been that it was often too thin and dilated to permit safe surgical entrance. It has been our experience that it is not often too thin for such an approach; if such a situation were encountered, the left superior pulmonary vein or a branch thereof could be used as a port of entry (Fig. 4).

The second principle is as follows: *the button-hole opening of the stenotic mitral valve should be approached from the auricular side so that the funnel directs the cutting instrument to the leaflet margin.*

In spite of these attractive technics for approaching the mitral funnel from above without dislocating the heart, there still remains the question that has haunted all discussions of this subject: Is it physiologically advantageous to convert tight mitral stenosis into free regurgitation? Clinicians have been arguing for forty-six years whether mitral regurgitation is better borne than stenosis or the reverse. It is apparent that complete stenosis is

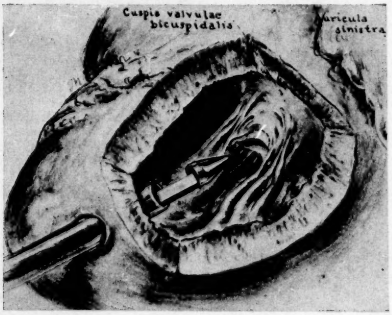

FIGURE 3. *Diagrammatic Representation Suggesting Difficulty of Finding the Apex of the Stenotic Funnel Blindly.*

The dotted line indicates that the surgeons planned to remove a segment of the anterior mitral leaflet. (Reproduced from Cutler and Beck,[11] by permission of the publishers.)

incompatible with life. Conversely, complete regurgitation is promptly fatal to the experimental animal, and patients tolerate marked degrees of mitral insufficiency poorly. Thus, either stenosis or regurgitation in advanced stages can cause the patient's death. The questions before the surgeons are: Is there any compromise between too small an opening in stenosis and a slightly larger opening at the cost of more regurgitation? Is there any way to restore some valvular action to the damaged valve? Are some types of insufficiency better borne than others? Ideally, surgical intervention should restore perfect valvular action; then the correction of obstruction in the light of the associated degree of insufficiency that is immediately produced would

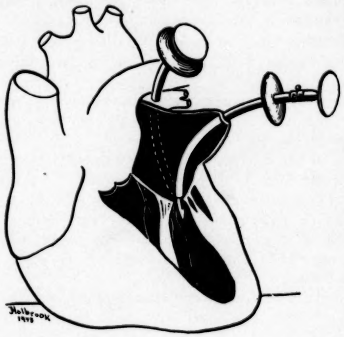

FIGURE 4. *Cardiovalvulotome in Position after Insertion through the Left Auricular Appendage and the Alternate Approach through a Branch of the Pulmonary Vein (Dotted Line). The cutting edge is in the ventricle, directed toward the fused posterolateral commissure of the stenotic funnel.*

not come under consideration. Unfortunately, that quality of valvuloplastic technic has not been attained.

During early work in our laboratory concerned with the experimental production of bacterial endocarditis,[23] the impression was gained that more than twice as many animals died from the destruction of the anterior mitral leaflet as from a corresponding destruction of the posterior leaflet. More recently, in 4 animals, it was found that left-auricular-pressure increments were roughly twice as high (equivalent to 10 to 20 as opposed to 5 to 10 cm. of saline solution) when anterior defects were produced as contrasted with posterior defects, and these changes were further increased during tachycardia. This suggested that insufficiency produced in various ways had different effects on the cardiac output and on the degree of regurgitation. Studies on a post-mortem human heart preparation[25] supported the hypothesis that there was more regurgitation from an anterior than a posterior defect. These experiments seem interesting to us but are not yet sufficient to be regarded as conclusive. They only support a theory that can be presented diagrammatically.

In Figure 5 it is apparent that the anterior leaflet acts as a baffle that deflects blood toward the aorta,

whereas the posterior leaflet acts as an obstruction directly in the path of blood flow from the ventricle to the aorta. If the anterior leaflet is cut, the baffle or shunt to aortic output is compromised, and yet the obstruction of the posterior leaflet remains. Conversely, if the posterior leaflet is resected, the obstruction is removed, but the outflow through the aorta is less affected.

Direct palpation of the mitral leaflets throughout the cardiac cycle offers another type of information in this regard. When the exploring finger is introduced through the left auricular appendage of a dog, the anterior leaflet swings free throughout the cycle, but the posterior leaflet is squeezed and buttressed by the posterolateral wall of the left ventricle in systole. In diastole, the myocardium swings away from the normal veil-like posterior mitral leaflet. Again, it seems advantageous to remove segments from the posterior leaflet on its lateral margins in the stenotic funnel; such defects may correct obstruction during diastole (auriculoventricular flow) and yet may be occluded by the contracting, buttressing myocardium during systole, allowing less regurgitation (ventriculoauricular flow) than a surgical defect in the anterior mitral leaflet.

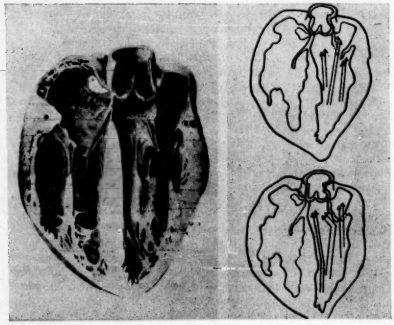

FIGURE 5. *Cross-Section of Heart, Showing the Relation of the Mitral Leaflets to the Aortic-Outflow Tract.*

The upper diagram illustrates the outflow tract broken by anterior valvulectomy; the posterior-leaflet obstruction remains. The lower diagram demonstrates the anterior leaflet intact as the wall of the outflow tract, the "selective insufficiency" being produced by removal of the posterior leaflet.

Thus, some degree of insufficiency having been accepted as unavoidable after surgical enlargement of the mitral orifice, the theory of "*selective insufficiency*" was evolved as being the most likely to benefit selected patients. Such insufficiency was produced in the first patient operated on. At the present time, the posterior defects and selective insufficiency are so created that the two commissures are cut away by wedge-shaped resections, with a view toward restoring some valvular action to the distorted, thickened leaflets. The wedge resections attempt to remove the fused zone that immobilizes the leaflets. This is the simplest form of "valvuloplasty" (Fig. 6).

The third principle is as follows: *surgical enlargement of the stenotic orifice should be so planned that there is minimal burden from the associated regurgitation (selected insufficiency) and maximum restoration of valvular function (valvuloplasty).*

Our experience with the first patient on whom operation was performed led to a fourth principle. The case history of this patient is as follows:

CASE 1. J. B., a 26-year-old tool grinder, was referred to the Boston City Hospital on March 12, 1947.* The present illness dated from April, 1946, when, for the first time, he coughed up small amounts of pink frothy sputum. Massive hemoptysis occurred in December, 1946, and recurred in February, 1947. Both episodes lasted for 10 days. The second episode was especially severe, producing shock and depleting the patient to half normal erythrocyte and hemoglobin levels. There was no dyspnea, orthopnea or chest pain.

The past history revealed frequent sore throats in childhood, but no definite history of rheumatic fever. The patient had been active and in good health and had passed a life-insurance examination in 1939 without difficulty. In 1942 he was told that he had rheumatic heart disease when he was rejected by the Selective Service board.

Physical examination revealed the maximal apical impulse 7.5 cm. left of the midsternal line in the fifth interspace; the midclavicular line was at 8.5 cm. The mitral first sound was increased. There was a Grade II blowing systolic and a rumbling diastolic murmur, with presystolic accentuation. The lungs were clear to examination. There was no evidence of venous congestion, hepatomegaly, ascites or peripheral edema. The blood pressure was 118/70.

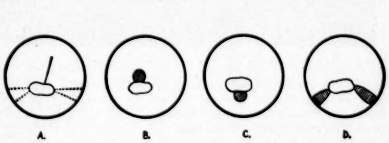

FIGURE 6. *Diagrammatic Representation of Various Operations on the Stenotic Mitral Ring as Seen from Above.*

A, *anterior valvulotomy (dotted lines indicate zones in the solid stenotic funnel that were commissures in the predisease state).* B, *anterior-leaflet valvulectomy.* C, *posterior-leaflet valvulectomy—"selective insufficiency."* D, *"selective insufficiency" and "valvuloplasty" by resection of the immobilizing commissure bridges.*

Teleroentgenography showed slight increase of the hilar shadows, normal lung fields and a heart that was somewhat enlarged with a contour consistent with mitral stenosis. There was no evidence of pulmonary disease by bronchoscopy and bronchography. The electrocardiogram was consistent with right ventricular enlargement, and the broad, notched P waves were suggestive of auricular enlargement. The circulation time (arm to tongue) was 16 seconds (calcium gluconate). The venous pressure was equivalent to 95 mm. of water. Examination of the blood disclosed a red-cell count

*Referred by Dr. Sidney Solomon, of Everett, Massachusetts.

of 3,850,000, and the hematocrit was 34 per cent. Catheterization of the right side of the heart showed an increased pulmonary-artery pressure of 55/30, with a mean pressure of 42. The right ventricular pressure was 50/7 (elevated). The resting cardiac output was within normal limits (5.95 liters per minute). A diagnosis of rheumatic heart disease with mitral stenosis, pulmonary hypertension and hemoptysis was made. It was decided to perform partial mitral valvulectomy on March 22.

Preoperative medication included 0.40 gm. of nembutal, 150 mg. of demerol and 0.65 mg. of scopolamine. The patient received quinidine (0.4 gm.) on the morning of operation. Immediately before induction with pentothal (2.5 per cent solution), 0.65 mg. of atropine was given intravenously. Then curare, 30 units, was given and repeated in 10 minutes. An endotracheal tube was then inserted, and the balloon inflated. Shortly thereafter, ether was added slowly to the anesthetic mixture. Continuous electrocardiographic recordings were made throughout the procedure.

The operation was performed with the patient on his back, with the left side elevated 30°. The head of the table was also elevated 30°. The incision in the third intercostal space extended from the sternum to the left anterior axillary fold.

FIGURE 7. *Photograph of the Cardiovalvulotome.*

On the left the trocar and cannula used in pressure determinations are illustrated. In the center the cardiovalvulotome in closed and open positions is shown. On the right, the detail of the cutting edge is demonstrated.

The pectoralis major and minor muscles were split. The mammary vessels were ligated and divided. The second and third costal cartilages were cut, the pleura incised, and the ribs spread. The thoracic inlet was infiltrated from within with 2 per cent procaine. The left superior pulmonary vein was isolated distally from the pericardium up to and including the anteromedial vein. Hemostatic traction sutures of No. 5 silk were looped around these veins. Transverse hemisection in the anteromedial vein between the control sutures allowed insertion of a No. 10 ureteral catheter into the left auricle. A mean pressure equivalent to 450 mm. of water was recorded. The *valvulotome* (Fig. 7) was then inserted, and a segment was taken from the posterior leaflet of the mitral valve. The interauricular pressure was then recorded as equivalent to 470 mm. of water. The valvulotome was reintroduced, and another disk removed from the posterior leaflet. Auricular pressure after this resection of the valve overflowed the 500-mm. water manometer. The rise in left auricular pressure was completely incomprehensible at this time, and it was deemed unsafe to resect any more of the leaflet. The ureteral catheter was removed, and the vein was ligated. It was estimated that less than 100 cc. of blood was lost in the five intracardiac manipulations. The chest was closed in layers with interrupted sutures. During operation, the patient received 40 cc. of plasma, 150 cc. of 5 per cent dextrose in water and 800 cc. of whole blood. His initial pulse was 78, but it rose to levels of 110 during induction of anesthesia. Shortly after the pleura had been opened and the ribs spread, the pulse gradually climbed to 140, remaining at this level throughout the remainder of the operative period; at all times it was regular. The blood pressure was constant at 100/60 to 110/70. Immediately after operation, the blood pressure was normal, the pulse 150 to 160, and the color fair. After the operation, the patient was observed on the operating table for 2 hours. The pulse remained unchanged; the systolic blood pressure gradually fell to 100. At this point, he was returned to the ward, where cyanosis of the nail beds and ears, with mottling of the forehead were noted. A positive-pressure mask was adjusted to provide 4 cm. of expiratory resistance for 15 minutes of every hour.

The temperature gradually rose to 106.6°F. 6 hours after operation, and at the same time, the systolic blood pressure dropped to 50. The clinical condition varied from minute to minute. Whole blood in small amounts was given to elevate the blood pressure, but signs of pulmonary congestion developed. The positive-pressure mask was poorly tolerated, and the resistance had to be eliminated. Rectal administration of aspirin and constant alcohol sponging reduced the temperature to 102.2°F., and it was maintained at this level. With the onset of hyperpyrexia, the patient became completely comatose, with a flaccid paralysis. There were no localizing signs. Eight hours after operation, intravenous metrazol was given with dramatic response; the patient became rational and conscious, talked fluently, moved all extremities and had normal reflexes. However, the systolic blood pressure never rose above 80, and cyanosis persisted. Shortly after the metrazol, the patient relapsed into unconsciousness, and the metrazol was repeated in 1-cc. doses, intramuscularly, every hour thereafter, with temporary return of consciousness and activity. The patient continued to exhibit varying degrees of peripheral vascular collapse, pulmonary edema and anoxia. He succumbed in respiratory collapse and pulmonary edema approximately 24 hours after operation.

Autopsy revealed that the heart weighed 380 gm. The leaflets of the tricuspid valve and the cusps of the pulmonic and aortic valves were thin and delicate. The chordae tendineae of the tricuspid leaflets were of normal appearance. The trabeculae carneae and papillary muscles of the right ventricle were moderately hypertrophied. There was some thickening of the wall of the right ventricle. The left auricle showed hypertrophy and dilatation of its wall. The leaflets of the mitral valve were interadherent with a resulting stenosis. The lumen, fish-mouthed in character, had a circumference of 3 cm. The chordae tendineae of the valve were markedly thickened and shortened. An operative defect in the medial portion of the base of the posterior leaflet measured 0.6 cm. by 0.3 cm.; it extended completely through the thick valve from the auricular to the ventricular surface. Grossly, the lungs were unusually firm. Microscopical examination revealed thickening of the alveolar walls, dilatation of the capillaries and increase in the interstitial tissue and pericapillary edema. These findings were consistent with those described by Parker and Weiss.[26] The spleen, kidneys, liver and gastrointestinal tract showed chronic passive congestion. Gross and microscopical study showed no abnormalities in the brain.

This case illustrates how completely even a carefully planned procedure can miscarry. The intended manipulation was carried out with dispatch, and the changes in the interauricular pressure were recorded. The result was disastrous. Even at autopsy it was not clear why the operation had caused a rise rather than a fall in the left auricular pressure and had resulted in pulmonary edema and death in twenty-four hours.

The anesthesia chart showed a pulse rate fluctuating from 90 to 110 at induction of anesthesia. The operation had started with a rate of 110, and the

rate had risen to 135 per minute before the intracardiac portion of the procedure was undertaken. It then rose steadily after the operation. This tachycardia had not been prevented by us; no doubt, the use of barbiturates, atropine and direct vagal block had increased the heart rate.

In the presence of tachycardia when the mitral orifice is stenotic or regurgitant, it seems possible that three factors tending to increase pulmonary vascular pressure can operate:

The stenotic mitral orifice permits blood to drain through it at a limited maximum rate only. The flow from auricle to ventricle occurs only during diastole. The duration of each systolic contraction is essentially the same whether the heart rate is fast or slow; therefore, the increased total systolic time of tachycardia is at the expense of the total diastolic time. With a reduced total diastolic period, there is less time for auricle-to-ventricle drainage or flow. Thus the obstructive effect of a stenotic mitral valve is greatest during periods of rapid heart action.

The undamaged right ventricle may pump more blood into the lungs during tachycardia.

The total volume of regurgitant blood is a function of the number of systolic contractions. The more rapid the heart, the more numerous are the regurgitant jets and, in general, the greater insufficiency in terms both of volume of regurgitant blood and of effect of regurgitant pressure on the left auricle and pulmonary circulation.

In short, tachycardia tends to increase pulmonary blood pressure by greater obstruction to forward flow, greater pulmonary filling from the undamaged right ventricle and increased regurgitation or backward flow from the left ventricle.

These factors, simple as they seem now, were not fully appreciated until the disastrous effects of tachycardia in the first patient were observed. Subsequent animal experiments have confirmed their importance, and these will be reported later. It is evident that during any operation on patients with mitral stenosis and regurgitation, a slow heart rate must be maintained.

These considerations have a bearing, too, on the selection of patients for operation. Patients in Group B who are able to maintain a normal resting cardiac output may have predominant mitral regurgitation. If so, their condition would only be made worse by an increase in the degree of insufficiency surgically, by tachycardia or particularly by a combination of these. For the patients in Group C, the operation of cardiac denervation is a direct attempt to diminish the hazard that tachycardia presents. The more closely we observe patients with severe mitral disease, the more conspicuous is the association of tachycardia with bouts of "pulmonary decompensation" such as paroxysmal dyspnea, pulmonary edema and hemoptysis.

The fourth principle is as follows: *in the presence of mitral obstruction or regurgitation, a rapid heart rate must be avoided; tachycardia tends to increase pulmonary vascular pressure and is associated with attacks of pulmonary edema or "pulmonary decompensation."*

The course of the second patient on whom valvuloplasty was performed illustrates that the procedure is feasible in human beings; perhaps the survival of this patient was aided by the measures taken to reduce tachycardia.

Case 2. G. A. C., a 27-year-old man, was referred to the Boston City Hospital in June, 1948.* The chief complaint was that of pain at the angle of the right scapula. Since the age of 8 years, he had had six attacks of "rheumatic fever," characterized by fever, chills and bone pain. With one episode he developed chorea and tender subcutaneous nodules. He had suffered from exertional dyspnea, palpitation of the heart and easy fatigability for 10 years at least. He had taken maintenance doses of digitalis since the early attacks in childhood. A chronic cough with occasional streaking of blood had occurred 3 years previously. At about that time, pain in the back of the right side of the chest started. This was nonradiating and could be relieved at first by changes in position. However, it had become progressively worse during the 2 months prior to admission and was constant at the time of entry. The patient was almost completely invalided during this period.

Physical examination revealed an emaciated young man with a *café-au-lait* complexion. There was slight venous distention in the neck. The heart was greatly enlarged to the right and left, and the rhythm was typical of auricular fibrillation with a rate of 110 and some pulse deficit. A soft diastolic rumble was heard from the lower end of the sternum to the apex. Near the apex, the murmur was loud and rough and there was a pronounced diastolic thrill. The pulmonic second was greater than the aortic second sound. The area of liver dullness appeared to be increased. There was no peripheral edema. The blood pressure was 110/65.

Six-foot teleroentgenograms revealed a greatly enlarged heart to both right and left. The left auricle was markedly enlarged. There was fluid in the right costophrenic angle. Films showed areas of patchy density in the right-middle and lower-lung fields, probably owing to atelectasis. The electrocardiograms showed auricular fibrillation and diphasic T waves, with low origin of Leads 1, 2 and 4. The venous pressure was equivalent to 180 to 230 mm. of water. The circulation time was 12 seconds (arm to lung) by the ether method. The hematocrit was 36 per cent. The vital capacity was 2.7 liters and dropped to 2 liters after exercise, when the pulse rate was elevated to 140. Measurement of the resting cardiac output by cardiac catheterization showed it to be low (3.4 liters per minute with a cardiac index of 2). With mild exercise the stroke volume decreased from a resting level of 52 cc. to 29 cc. The pulmonary-artery pressure was elevated (71 systolic, 39 diastolic and 51 mean) and showed a further increase during exercise. Evidence of right ventricular failure was afforded by the elevated resting right auricular pressure (8 mm. of mercury), which increased to 9.5 mm. after 1 minute of mild exercise and to 18.5 mm. on manual pressure over the right upper quadrant.

In view of the general condition and the results of the physiologic studies, valvuloplasty was considered indicated.

Operation was performed on June 16. Premedication included 100 mg. of seconal, 100 mg. of demerol and 0.5 mg. of scopolamine. Induction was uneventful with nitrous oxide and cyclopropane; endotracheal anesthesia was maintained with ether. The heart rate was followed continuously by electrocardiographic tracings. The patient was placed in the dorsal decubitus position. A left anterior intercostal approach through the third space was carried out, with division of the second and third costal cartilages at the sternum. Filmy adhesions held the lung to the chest wall. The pericardium was opened transversely down to

*Referred by Dr. Sawyer Foster, of Boston, Massachusetts.

the phrenic nerve. The left lateral aspect of the left auricle and the left auricular appendage were exposed by freeing diffuse adhesions to the pericardium. A pulmonary conus perhaps three times the normal size presented anteriorly. Three No. 000 silk purse-string hemostatic sutures were placed around the auricular appendage at the projected cardiotomy site. Through this prepared site in the tip of the left auricular appendage a trocar and cannula (Fig. 7) were then introduced, the trocar was removed, a manometer was attached to the cannula, and the interauricular pressure found to be equivalent to 450 mm. of saline solution at a pulse rate of 92. The cardiovalvulotome (Fig. 7)

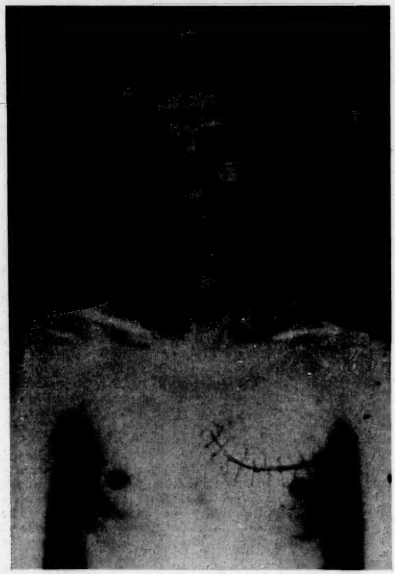

FIGURE 8. *Patient in Case 2 Two Months after Mitral Valvuloplasty.*

was introduced with the cutting edge directed at the lateral commissure, the valvulotome hook engaged, and the instrument closed. The cutting sensation and sound were elicited, but the segment was not recovered. The maneuver was repeated with the instrument directed at the medial commissure. Finally, a segment of the stenotic funnel was removed in a third maneuver directed at the posterior aspect of the lateral commissure. After these three intracardiac cutting manipulations, the interauricular pressure was again taken and found to be equivalent to 400 mm. of saline solution even though the pulse rate had risen to 108. During these five intracardiac procedures, 40 mg. of procaine was given twice intravenously. Upon completion of the intracardiac manipulations, the instruments were withdrawn, and the cardiotomy site was sealed by tying the purse-string sutures. The closure of the auricle was reinforced by the pericardial closure in that zone. The remainder of the pericardial incision was loosely closed to allow the escape of any effusion. The anterior thoracotomy incision was closed in layers in a routine fashion, without drainage.

The postoperative course was uneventful, and the patient was subjectively improved during his immediate hospital convalescence. The pain that represented his chief complaint on admission disappeared, and he seemed to have an increased exercise tolerance.

The first objective studies made since the operation show little improvement in cardiac function over that prior to operation. The size of the left auricle has not diminished. Follow-up studies will be reported.

This operation was directed at increasing the size of the mitral orifice itself. That the patient would benefit by this procedure was suggested by the low cardiac output and the stroke volume that decreased with exercise. The principle of increasing the size of the mitral orifice and yet producing "selective insufficiency" was combined with an attempt at removing the immobilizing commissures, the current crude form of "valvuloplasty." Intravenous procaine was given during the operation to reduce myocardial irritability and as a part of the effort to maintain a slow heart rate. The operation was uneventful, and the pressure studies at the time suggested a favorable response. Since operation, the patient has been dramatically improved subjectively, although such objective studies as have been made show little change from the earlier investigations.

Before operation it was known that the general condition of this patient made him a much worse operative risk than the first patient. However, operation was elected after the poor prognosis, the progression of symptoms despite a rigid medical regime and catheterization studies that suggested possible benefit through valvuloplasty had been considered. The four principles of surgery on the mitral valve were applied, and the commissures and one segment of the posterior leaflet of the stenotic funnel were removed. This patient is alive today, symptomatically improved, five months after operation (Fig. 8).

SUMMARY AND CONCLUSIONS

Numerous complex physiologic and morphologic factors are concerned in the production of symptoms in patients with mitral stenosis.

A preliminary classification is presented of patients incapacitated by mitral stenosis, who may be benefited by different types of surgery: Group A, patients with low fixed cardiac output — mitral valvuloplasty; Group B, patients with normal cardiac output — artificial interatrial shunt; Group C, patients with uncontrollable tachycardia or with anginal pain — cardiac denervation.

Five operations have been performed. Mitral valvuloplasty was performed in 2 patients of Group A, with 1 death. Artificial interatrial defects were produced in 2 patients of Group B, with survival in each case. Denervation of the heart by bilateral removal of the inferior cervical and dorsal first to fourth ganglions in 1 patient of Group C was followed by improvement.

These cases are now reported only to indicate the ability of such patients to withstand operation. The evaluation of any long-term benefits attributable to these procedures — and, indeed, of the ultimate position of surgery in mitral stenosis — must rest on objective criteria gained from hemodynamic studies carried out before and after operation. Subjective selection of patients and assessment of results lead to dangerous competitive exercises in surgical technics rather than to fundamental advances in therapy.

Four principles of the surgery of mitral stenosis have been evolved: the operation should be performed without dislocation of the heart from the position of optimum function; the button-hole opening of the stenotic mitral valve should be approached from the auricular side so that the funnel directs the cutting instrument toward the leaflet margin; surgical enlargement of the stenotic orifice should be so planned that there is a minimum burden from associated regurgitation ("selective insufficiency") and maximum restoration of valvular function ("valvuloplasty"); and in the presence of mitral obstruction or regurgitation, undue acceleration of the heart rate must be prevented — tachycardia increases pulmonary vascular pressure and is associated with attacks of pulmonary edema and other forms of "pulmonary decompensation."

An unsuccessful attempt at producing "selective insufficiency" is presented. It is suggested that tachycardia was an important factor in the disastrous outcome.

A case report is presented of the survival of a patient with mitral stenosis following an operation designed to produce "selective insufficiency" and "valvuloplasty" of the mitral valve.

The need for more extensive and more effective valvuloplastic technics is suggested.

We wish to express our appreciation for criticisms and suggestions to the following members of the Board of Consultants of The Heart Institute of the Sias Laboratories: Drs. Burton E. Hamilton, Frederic Parker, Jr., Richard Schatzki and Paul M. Zoll.

References

1. Brunton, L. Preliminary note on possibility of treating mitral stenosis by surgical methods. *Lancet* **1**:352, 1902. Surgical operation for mitral stenosis. *Ibid.* **1**:547, 1902.
2. Haecker, R. Experimentelle Studien zur Pathologie und Chirurgie der Herzens. *Arch. f. klin. Chir.* **84**:1035-1098, 1907.
3. Bernheim, B. M. Experimental surgery of mitral valve. *Bull. Johns Hopkins Hosp.* **20**:107-110, 1909.
4. Cushing, H., and Branch, J. R. B. Experimental and clinical notes on chronic valvular disease in dog and possible relations to future surgery of cardiac valves. *J. M. Research* **12**:471-486, 1907-1908.
5. Schepelmann, E. Versuche zur Herzchirurgie. *Arch. f. klin. Chir.* **97**:739-751, 1912. Herzklappen Chirurgie, Experimentelle Untersuchen. *Deutsche Ztschr. f. Chir.* **120**:562-579, 1913.
6. Carrel, A., and Tuffier, T. Étude anatomopathologique et expérimentale sur la chirurgie des orifices du coeur. *Presse med.* **22**:173-177, 1914.
7. Cutler, E. C., and Levine, S. A. Cardiotomy and valvulotomy for mitral stenosis. Experimental observations and clinical notes concerning operated case with recovery. *Boston M. & S. J.* **188**: 1023-1027, 1923.
8. Cutler, E. C., Levine, S. A., and Beck, C. S. Surgical treatment of mitral stenosis: experimental and clinical studies. *Arch. Surg.* **9**: 689-821, 1924.
9. Beck, C. S., and Cutler, E. C. Cardiovalvulotome. *J. Exper. Med.* **40**: 375-379, 1924.
10. Cutler, E. C. Surgical aspect of mitral stenosis. *Arch. Surg.* **12**:212-229, 1926.
11. Cutler, E. C., and Beck, C. S. Surgery of heart and pericardium. In *Nelson's Loose-Leaf Living Surgery.* Edited by A. O. Whipple and F. B. St. John. Vol. 4. 712 pp. New York: T. Nelson & Sons, Chap. IV. Pp. 286-320, 1927.
12. *Idem.* Present status of surgical procedures in chronic valvular disease of heart: final report of all surgical cases. *Arch. Surg.* **18**: 403-416, 1929.
13. Allen, D. S., and Graham, E. A. Intracardiac surgery — new method: preliminary report. *J. A. M. A.* **79**:1028-1030, 1922.
14. Allen, D. S. Intracardiac surgery. *Arch. Surg.* **8**:317-326, 1924.
15. Souttar, H. S. Surgical treatment of mitral stenosis. *Brit. M. J.* **2**: 603-606, 1925.
16. Pribram, B. O. Die operative Behandlung der Mitralstenose. *Arch. f. klin. Chir.* **142**:458-465, 1926.
17. Burgess, A. M., Jr., and Ellis, L. B. Chest pain in patients with mitral stenosis, with particular reference to so-called "hypercyanotic angina." *New Eng. J. Med.* **226**:937-941, 1942.
18. Harken, D. E., and Glidden, E. M. Experiments in intracardiac surgery. II. Intracardiac visualization. *J. Thoracic Surg.* **12**: 566-572, 1943.
19. Harken, D. E. Foreign bodies in and in relation to thoracic blood vessels and heart. I. Techniques for approaching and removing foreign bodies from chambers of heart. *Surg., Gynec. & Obst.* **83**: 117-125, 1946.
20. Harken, D. E., and Williams, A. C. Foreign bodies in and in relation to thoracic blood vessels and heart. II. Migratory foreign bodies within blood vascular system. *Am. J. Surg.* **72**:80-90, 1946.
21. Harken, D. E., and Zoll, P. M. Foreign bodies in and in relation to thoracic blood vessels and heart. III. Indications for removal of intracardiac foreign bodies and behaviour of heart during manipulation. *Am. Heart J.* **32**:1-19, 1946.
22. Harken, D. E. Review of activities of Thoracic Center for III and IV hospital groups, 160th General Hospital European Theater of Operations, June 10, 1944, to Jan. 1, 1945. *J. Thoracic Surg.* **15**:31-43, 1946.
23. *Idem.* Experiments in intracardiac surgery. I. Bacterial endocarditis. *J. Thoracic Surg.* **11**:656-670, 1942.
24. Color sound moving picture. Foreign bodies in pericardium and heart (demonstration of heart operations). U. S. Army Signal Corps. Production misc. No. 1238.
25. Donovan, T. J., and O'Brien, R. Unpublished data.
26. Parker, F., Jr., and Weiss, S. Nature and significance of structural changes in lungs in mitral stenosis. *Am. J. Path.* **12**:573-598, 1936.

MEDICAL SCHOOLS AND THE QUALITY OF MEDICAL CARE*

A Survey of Recent Trends

E. RICHARD WEINERMAN, M.D., M.P.H.†

BERKELEY, CALIFORNIA

INCREASING attention has been paid in recent years to the economics of medical care. Proposals for newer health-service programs have stimulated a voluminous literature, and many important experiments in organized medical care have been developed to meet the increasing public demands.

Few students of the problem would quarrel with this emphasis upon costs and distribution of care. Ready access to adequate health services must exist for all the people.

The removal of economic barriers, however, would in itself not provide the whole answer to the medical needs of the country. There remains the challenging task of improving the *quality* of the service that is to be more equitably distributed. A serious gap persists between the standards of the teaching medical centers and the quality of care rendered in outlying and underprivileged communities

In the effort to improve the general quality of medical care throughout the country, the medical schools are realizing the significance of the role they must play. This concept has been clearly expressed by the chairman of the Council on Medical Education of the American Medical Association[1] and by the secretary of the Association of American Medical Colleges.[2] In their emergence from the isolation of the last century, the schools developed close relations with universities and teaching hospitals. Now, such affiliations are beginning to extend to public health and social agencies, to smaller hospitals and health centers, and to practicing physicians in the surrounding area.

If improved quality is to accompany the better financing of medical care, and if the influence of the medical schools is to bear on the problem, this new and broader concept of the function of the school must be universally adopted. The basic functions of teaching and research expand to include the concept of service to the community, of active identification with the medical life of the surrounding region. The modern medical center becomes the hub of continuous postgraduate educational activities, of regional medical-service programs reaching to outlying rural areas and of functional relations with all community health facilities. Thus, the quality of medical care may be enhanced throughout the region of the teaching center.

Such a development is neither new nor visionary. Many medical schools in this country have accepted responsibilities for improving medical standards in their areas. Several of the foreign nations are developing health-service regions around medical teaching centers. This report includes descriptions of some of the projects already underway in the United States in one phase or another of the general movement. Through broader orientation toward the preventive and social aspects of medicine, through continuous education of the physician and his technical aides and through functioning affiliations between metropolitan and small community hospitals, the quality of medical care available to the public is being steadily improved.

UNDERGRADUATE MEDICAL TRAINING

In the fifty years since the development of the modern medical course, there have been vast and fundamental additions to the medical sciences. Whole new fields have opened up in nuclear physics, nutrition, tropical medicine, antibiotics, neurologic surgery and endocrinology — to mention but a few. Yet the "modern" medical curriculum existed in 1891, and prevailed in all schools by 1915. Since then, such development as has occurred has been somewhat haphazard and unplanned — often involving cumbersome additions to a fixed structure.[3-5]

Increasingly apparent, moreover, in an industrialized, mobile society have been the interpersonal, social and environmental aspects of health and disease. The tremendous growth of organized systems of prepayment medical care, group practice, health units and preventive medical programs has changed the face of medicine, without producing very extensive alterations in the countenance of the medical schools. Notable exceptions to this rule are described below.

Such developments require parallel readjustments in the medical curriculum.[6] Fifty years ago, Johns Hopkins University School of Medicine made such a break with the educational *status quo* in introducing the "modern" curriculum. The stage is now set for the next step forward.

*From the Department of Public Health Practice, Division of Medical Care, Harvard School of Public Health.

Much of the material in this paper was derived from the report on regional medical centers to the New York State Temporary Commission on Need for a State University (Young Commission) and is used with the permission of the Commission.

†Associate professor of medical economics, School of Public Health, University of California; formerly, fellow, Harvard School of Public Health.

Interdepartmental Integration

The rapid growth of each field of medicine has often resulted in rigid compartmentalizing of the curriculum, with relatively isolated academic divisions each competing for the student's time and attention. If better equipped physicians are to be produced for modern medical practice, heed must be paid to the pleas of medical leaders for the development of integrated "vertical" medical courses.[7–9] Such a curriculum would stress the importance of "dynamic units of study"[4] instead of traditional departmental boundaries. Eadie and Davison[10] have urged a general course structure that is completely functional in concept, whereby each of the separate disciplines contributes to the total understanding of the subject under study.

Integration activities at the Bowman Gray School of Medicine may be mentioned by way of example of efforts in this field.[11] At this new school studies in basic science are being related to their sick-bed implications through medical and surgical clinics designed to illustrate the principles under discussion. The preclinical faculty members make hospital ward rounds, and residents in the various specialties are given teaching assignments in the basic-science courses. Departmental autonomy is increasingly relinquished. Similar efforts are under way at the Western Reserve University School of Medicine[12] and at a few others.

New Emphasis in the Curriculum

Such general integration of the curriculum can go a long way toward improving the quality of the training offered. However, the requirements of modern medicine call for the addition of some specific new elements and the strengthening of others in the general medical courses. These are, significantly enough, the disciplines that examine the relations of the sick man to his fellows and his community. Their influence on the quality of professional care is fundamental.

Psychiatry

Although the teaching of psychiatry has progressed in recent years, medical students are often inadequately provided with training in the understanding of the personal and emotional relations in health and disease. Undergraduate training in this field is too often restricted to a few mental-hospital case studies and a disjointed series of lectures on psychiatric disorders. A recent statement by nineteen medical-school deans declared: "There are not five medical schools in the United States with Departments of Psychiatry adequately endowed."[13]

Still entirely undeveloped is the potentially much more productive field of mental hygiene. The medical student is now rarely impressed with an appreciation of the gigantic task to be performed through preventive psychiatry — especially in childhood — in the control of mental disorders that fill no less than half the hospital beds of the nation. The recently passed National Mental Health Act provides funds for research and training in this field, and should serve as the needed stimulus to expanded undergraduate activity.

The teaching of psychiatry at University of Louisville School of Medicine exemplifies commendable efforts now underway in some schools.[14] Here psychiatric instruction permeates the entire course. The city mental-hygiene clinic is a part of the Department of Psychiatry, which includes three full-time teachers. The program involves seminars, clinical clerkships, home visits, observations of therapeutic interviews, participation in nursery-center operations and the like. Student participation remains the key to the program. More recently, sweeping reorganization of the psychiatric teaching program has been instituted at Yale University School of Medicine.

Preventive Medicine

In a medical philosophy focused on disease and its treatment, the promotion of health and the prevention of illness receive country-cousin attention. Almost every medical educator has been constrained to point out that a fundamental preoccupation with disease — to the exclusion of efforts to prevent it — is a primary weakness of modern medicine.

A recent report[15] indicates that twenty-eight of the eighty-seven schools in the United States and Canada have no organized program for instruction in prevention, and most of the schools do not regard such emphasis as important. Teaching hours are often those that no other department wants, and the median number of clock-hours total only 1.9 per cent of the general curriculum. Little or no instruction is incorporated into the preclinical years, and such instruction as was reported is usually didactic, with little relation to the clinic, the health center or the community.

The recommendations of the Committee on the Teaching of Preventive Medicine and Public Health recognized that the objective was not to produce junior health officers but to imbue the embryo physician with the concept of positive health and with the philosophy of preventive medicine. A separate department with a full-time chief, having 4 per cent of the curriculum hours and 5 to 8 per cent of the total budget, was urged for all schools. Teaching in the preclinical years and full co-ordination with other clinical departments was strongly recommended. This seems modest indeed.

Dublin[16] has described the specific accomplishments of a forward-looking department of preventive medicine at Long Island College of Medicine. His course in preventive medicine embraces the full facilities of the nearby community public-health

center and is closely correlated with clinical teaching. Senior students spend full time for four weeks in this work — participating in health clinics, field activities, seminar discussions, home visits and social-work programs.

Similar affiliations of local health units with departments of preventive medicine operate at Louisville, Cornell, New York University, Alabama, Manitoba and a few other schools of medicine. In this connection, Goodenough[17] and many others have stressed the very real importance of student health services as a practical demonstration of preventive technics and an opportunity for student participation in a program of health conservation.

Social and Economic Aspects of Medicine

By the intelligent development of courses in socioeconomics, medical schools can overcome the single most serious deficiency in the modern system of medical education. The need for such new emphasis has been succinctly expressed by LeBlanc[18]:

> Somewhere along the line of medical education, the embryo doctor should come in contact with the economic facts of life. . . . Medical students are, from an economic standpoint, a favorably selected group. They come from higher strata rather than the lower. It is not only likely, but experience has shown it to be true, that they know little or nothing about the economically underprivileged. Even in their dispensary work they are seeing their patients in a frame far more flattering than normal. They have never seen or smelled bad housing; they know nothing of the reality of bad diets; of broken homes; of unemployment; of what it means when the breadwinner is sent to a hospital for a long stay; of the thousand and one things never seen at the hospital bedside or in the dispensary.

Yet, in twenty-two of the schools no time is devoted to medical socioeconomics, and the over-all number of clock hours devoted to the subject is 3.9 (median number = 1.5).[19] A recent statement by a medical student highlights the situation: "When confronted with the question 'What information would you like to have included in a course on health economics?', many of the students immediately retorted, 'What is health economics?' "[20]

Similarly, a survey conducted by the Association of Internes and Medical Students revealed an overwhelming desire on the part of the student sample for more instruction in these matters.[21] At Harvard, student interest manifested itself in a highly successful series of medical-sociology seminars organized and run as an extracurricular activity.

Many voices have been raised in recognition of this need. Allen,[7] Leavell,[22] Means,[23] Goldmann,[24] Gregg[25] and others[26] have forcefully stressed the need for the teaching of medical socioeconomics. Oxford University and the University of Brussels have established well known chairs in social medicine, as have other leading schools in Europe and Canada. A few of the schools in this country have already organized some instruction in this field. One of the best known courses has been that at Yale, where — until recently — regular seminars have been offered in the subject.[24] A briefer orientation course is available at the University of Minnesota Medical School,[27] and a ten-hour elective is being offered at the University of Colorado School of Medicine.[28]*

Medical socioeconomics should include instruction in the organization and administration of medical-care programs if new graduates are to be able to find their way logically through the turmoil of public discussion of these problems. The medical student should be acquainted with such modern phenomena as Blue Cross plans, group-practice associations, union medical-care projects, rural health co-operatives, veterans' services and welfare medical programs. The experience of foreign health-insurance systems should be analyzed, and current national legislation studied. Effective medical-care teaching can obviously be done best when the school itself is actively involved in the development of medical-service programs in which the students can participate. The value of medical-care activity in the medical school has been discussed in detail for Cornell University Medical College and New York Hospital by Pastore.[29] The affiliation of the New York University Medical Group with the health-insurance plan of Greater New York and of both Johns Hopkins and Maryland medical schools with the new Baltimore plan are cases in point.

In 1940, Gregg[30] gave the sharpest possible emphasis to this phase of medical training: "I venture to say that the order in which medical schools in this country organize seminars and courses on social medicine will be a serial registrar of the relative alertness of their administration."†

Community and Field Work

Training in modern medicine is enhanced by the personal introduction of the student to the various health and medical activities of the community. Work in local health centers, public-health laboratories, social-welfare agencies, group-practice organizations, private practitioners' offices, industrial clinics and the like is invaluable experience for the developing practitioner. Similarly important are student visits to the home and job environments of the patients and co-operation with medical social workers. There seems to be a good reason for the suggestion that the summer months of medical school be devoted to such field observation and training[6] and not wasted during a generally overcrowded curriculum.

*Greater attention to the subject of health economics and medical care is paid at some of the schools of public health, particularly at Michigan and, more recently, at Harvard. Plans for expanded work in health economics are now also underway at Johns Hopkins, North Carolina and California Schools of Public Health.

†A careful study of social medical teaching in all American medical schools and a strong exposition of its importance has been recently released by an expert Committee of the Association of American Medical Colleges and the American Association of Medical Social Workers.[31]

Some of the schools have taken important initial steps to introduce their students to the extrahospital aspects of health and disease. At Harvard teaching centers (Massachusetts General and Beth Israel hospitals), special sessions are devoted during the clinical clerkship to the social and environmental aspects of the cases assigned for student work-up.[23, 26] At the University of Pittsburgh, joint case investigations by both medical and social-work students have been organized.[32] The University of Syracuse has developed a plan whereby each clinical clerk must study intensively the complete socioeconomic background of at least one hospital patient, including contacts with appropriate community agencies.[33] Dalhousie University in Halifax requires that students visit patients' homes together with the public-health nurse and report on the implications of their findings.[34] At California and Wisconsin, fourth-year students are given opportunity to spend time with practicing rural doctors.

An approach to the goal of "harmonized" community health services has recently been described at the new four-year Medical College of Alabama.[35] The offices of medical school, teaching hospital, local health department, outpatient clinics, county hospital and medical society are physically as well as functionally united. Incorporated in the school buildings are also the offices of the voluntary health agencies and living quarters for students, staff and hospital residents.

Graduate Medical Training

Internship and Residency

The institution of intern and residency training marked a major step forward in medical education. Six schools in the United States and four in Canada require a year's internship for the degree of Doctor of Medicine, and twenty-three states have made it a requisite for the medical license. Today there is need for further improvement in the graduate training system. Medical schools have important opportunities for improving the quality of medical practice by broadening the scope of the hospital affiliations in which they are involved.

Of the 6280 registered hospitals in the United States, only about 300 are affiliated for teaching purposes with medical schools.[36] Yet over 1000 hospitals are approved by the American Medical Association for residency training,* and over 800 for intern training.[37] It is apparent that significant improvements could be achieved if the medical schools were to increase their influence on the standards of graduate education in the nonaffiliated hospitals. Thus, both resident and visiting staffs would benefit from regular exposure to the best of clinical instruction. The concept of regional-hospital networks, described below, lays the basis for such supervised training programs.

Jensen[38] has reported a valuable experiment in the provision of follow-up medical service for discharged hospital patients by a resident staff member. This experience not only improved the care of chronic cases and reduced the number of readmissions, but served to highlight the complex social and economic factors in each case. Similarly, some of the better teaching hospitals are attempting to improve the scope and vision of their graduate training programs by establishing domiciliary services, clinic experience and social-service conferences for the house staff. Plans for the rotation of the house staff through outlying local hospitals have been reported at Alabama, Michigan, Colorado, Tulane and Rochester and at many of the other schools described below.

Postgraduate Education and Community Service

The most obvious and immediate contribution that a medical school can make to the quality of medical practice is in the field of postgraduate medical education. In a swiftly developing profession such as medicine, the greatest impediment to high standards of practice is the difficulty in keeping abreast of the times. The medical schools are therefore paying more and more attention to their postgraduate obligations.

The foundation of an effective system of postgraduate training again rests squarely upon the establishment of a co-ordinated regional network of health and hospital facilities — starting with the rural and community health centers, feeding into larger district hospitals, and converging upon a central base institution affiliated with a medical school. In such functional systems, continuous professional education can be carried on, and the influence of the best medical centers can reach the rural and suburban areas.

Regionalism in Health Services

In a health-service region, the functionally unified medical "trade area" replaces the often unwieldy political unit. An integrated network of hospitals and health centers takes the place of the present haphazard relation of medical facilities. Throughout the nation, health-service regions can be delineated on the basis of such factors as administrative relations, geographic and population characteristics, transportation facilities, established health resources, natural lines of trade movements and current flow of patients to practitioners and hospitals. Within these broad regions, functional subdistricts can similarly be defined.

Each health-service region can develop within itself the elements of a self-sufficient and comprehensive health system. Community clinics, hospitals, public-health units, nursing homes and other

*Including Army, Navy, Veterans Administration and Public Health Service hospitals.

facilities can co-ordinate into a service network that provides the individual practitioners with complete facilities and reaches all the people with adequate health care. The outlines of such a concept have been worked out by the United States Public Health Service,[39] a Senate committee on Wartime Health and Education[40] and the National Commission on Hospital Care,[41] among others. This principle has been given national impetus by the recent passage of the Hospital Survey and Construction Act, and has already been worked out in some detail by several states.

The Role of the Medical Center in the Health Service Region

The hub of the proposed system of regionalized health services is the medical teaching center. The base hospital is the university-connected institution where teaching, research, specialized medical care and consultation services are integrated. The co-ordinated network of community-hospital and health-center facilities affords the school an ideal opportunity for student training in the socioeconomics of health and in the problems of everyday practice. In turn, the scientific activities at the teaching center stimulate improved standards of medical care throughout the region.

The flow becomes a two-way affair. Consultants and instructors can visit the community institutions, bringing to the local practitioners the needed professional contacts and opportunities for refresher training. Students and graduate trainees can participate at all levels of the system, carrying with them the freshness of recent studies, and learning at first hand about the opportunities and responsibilities of local practice. Laboratory, administrative and library aids can become available to the peripheral institutions.

On the other hand, there can be a steady in-flow of referred patients, diagnostic materials and health personnel from the outlying areas. Special laboratory and radiologic services can be concentrated at the regional centers. Physicians, dentists, nurses and auxiliary technicians can travel to the center for advanced training, refresher courses and special conferences. Co-ordinated record-keeping becomes possible. The teaching center can realize its fullest opportunities for continuous professional education and for service to the outlying areas of the region.

Such regional affiliations can do much to overcome the reluctance of younger, well trained physicians to settle in rural areas. Continuous contacts with the teaching center, available consultants, more adequate laboratory and x-ray aids and better local hospital facilities contribute to more desirable professional conditions. The attraction of competent practitioners to rural communities is an absolute essential in any effort to improve health services for the nation.

Finally, the regional system of co-ordinated metropolitan, district and local hospitals can approach the goal of group medical practice for sparsely settled and outlying areas. Obviously, a working group of physicians cannot be supported in a small, rural community. Through regional affiliations, however, specialists in the district and base centers can effectively co-ordinate with general practitioners in the rural localities. The high standards of modern, scientific teamwork medicine can thus be approached throughout the region.

Description of some of the existing experiments in regional planning may serve to illustrate this concept.

The Bingham plan. With the financial support of the Bingham Associates Fund, the Joseph H. Pratt Diagnostic Hospital and Tufts College Medical School have undertaken to co-ordinate medical care in nearby rural areas of Maine and Massachusetts.[42] Outlying community hospitals affiliate with regional hospitals in the larger cities. The teaching center in Boston is the hub of the system. Proger[43] has described the plan as one involving diagnostic hospital service, hospital extension services and postgraduate courses. Laboratory and diagnostic services are promoted in the periphery. Patients are referred centrally for diagnostic and occasional therapeutic aid. Local doctors and ancillary personnel move to the regional and Boston institutions for consultations, conferences and instructional courses. A centrifugal flow of technical aids and teaching personnel proceeds concurrently.

Emphasis is placed upon continuous education of the community physician through detailed case reports, follow-up literature, visiting ward rounds, conferences and refresher courses. Tufts medical students are to be given experience in rural clinical clerkships, and plans are developing for the rotation of medical and surgical residents through the community hospitals.

The Rochester plan. A similar regionalization project has been financed by the Commonwealth Fund, centered around the University of Rochester Medical School and six hospitals in the City of Rochester, New York.[44] Seventeen community hospitals in the area have voluntarily affiliated in a regional scheme that involves referral of difficult patients to the medical center, travel by visiting consultants and professors from the University to the outlying districts, rotation of residents through the local hospitals, fellowships for local doctors, nurses and technical personnel to study at the center, and continuous teaching programs designed to meet the needs of busy practitioners. Grants of funds for plant expansions are available to the affiliated community hospitals. A somewhat smaller project at the Medical College of Virginia in Richmond incorporates the same principle.

The Michigan plan. For some years the University of Michigan has operated a program of affilia-

tion with outlying community hospitals. Clinical professors conduct "circuit courses" in the local institutions, and resident physicians from the smaller units return to the medical center for eight months of training in the basic sciences.[45] A similar plan for interns at small hospitals is now under discussion.

The University of Michigan Medical School, in conjunction with the State Medical Society, has also maintained since 1927 a department of postgraduate education. Brief refresher courses, summer-session institutes and individual instruction for practitioners have been part of a regional system since 1934. In the academic year 1937-1938 a total of 1957 practitioners participated in the program. A formal certificate of postgraduate education is now awarded for attendance at 60 per cent of the short courses over a four-year period.

Other postgraduate programs. The University of Minnesota has maintained a center for continuation study on its campus, where local practitioners may actually reside while taking short refresher courses.[46] In ten years of operation, 2700 postgraduate students have participated. Recently, this institution has pioneered in the training of general practitioners in psychiatry.

New York University has recently inaugurated a system of community-hospital affiliations with institutions suburban to the metropolitan center. With the aid of the Kellogg Foundation a program of residency training includes one year of academic study at the School and assignment of teaching consultants for periodic visits to the affiliated small hospitals.[47]

At the University of Colorado — again with Kellogg funds — a similar regional plan will coordinate rural hospitals with the university center. House officers preparing for general practice spend two years at the University Hospital and rotate through selected community hospitals during a third year. The medical school establishes standards and furnishes visiting teachers and consultants for resident (and visiting) staff instruction. This plan is a co-operative venture of the State Medical Society, the Hospital Association and the University.[48]

The Universities of Tennessee and Vanderbilt have co-operated with the Tennessee State Medical Society, the State Health Department and the Commonwealth Fund in supporting circuit courses for general practitioners throughout the State. The first circuit was attended by 46 per cent of the physicians in the State.[46] Fellowships are also available for more extensive courses of study.

A 1946 report of the New York State Health Preparedness Commission[49] has described in great detail the possibility for health regionalization throughout the State, again with the recommendation that the base centers be established in the medical schools.

Experiments in regionalism and postgraduate education have also been undertaken at Tulane, Bowman Gray, Iowa and Wisconsin. Several of the foundations, in addition to those already mentioned, have contributed to the support of these medical-school-hospital-service programs. The Duke Endowment has stimulated hospital co-ordination in the Carolinas, as has the Kellogg Foundation in Michigan. Various state medical societies have sponsored postgraduate sessions for local practitioners, including Connecticut, Idaho and North Carolina. In Canada, both Manitoba and Saskatchewan are developing provincial health services on the regional network principle.

The North Carolina proposals. The medical commission chosen to consider the question of expanding to a full four-year school the present basic-science course at the University of North Carolina rendered an affirmative majority report primarily on the basis of the potential value of a state-wide health-service program that could be centered in the new school.[50] It was pointed out that new graduates could not be held in rural areas (a primary need in the State) unless a program were established to provide them with the necessary facilities and professional contacts.

The plan as outlined includes an interrelated hospital network centered around the state medical school, similar in design and function to the program at Tufts. One weakness of existing regional programs has been recognized in the Commission's strong recommendation that close coordination with the preventive services of public-health agencies be maintained at every level.

An important additional feature, moreover, has been proposed to overcome the economic weakness of the other regional projects. Basic financial problems have continually threatened the success of existing hospital network and postgraduate educational systems. Outlying physicians are not always anxious to refer patients to district medical centers if this entails "losing" the case. Large numbers of the people cannot afford to utilize the hospital network even when it does exist. New health centers and local hospitals cannot be constructed and maintained in communities with deficient medical purchasing power, just as the best of regional plans will not attract to rural areas the doctors who cannot obtain decent incomes there.

Essential to the success of the new concept, therefore, is the establishment of organized systems of group prepayment and tax-supported medical care. Such a unified state-wide plan of financing is the recommendation of the North Carolina Commission. Thus, the facilities can be fully utilized by all the people of the region, and physicians would face no great economic hardships in choosing for practice the particular localities most in need of their services.

The Long Island proposals. Similar vision has been evidenced in the comprehensive program recently announced by the Long Island College of Medicine.[51] This project envisages a regional system throughout the Brooklyn and Long Island area, financed by voluntary prepayment and served by group-practice units in co-ordinated health centers. Major emphasis is laid on preventive services and family-health maintenance. Continuing professional education would be carried on throughout the region. Courses for nurses, technicians, dietitians and so forth would be regularly available.[51]

Financial Considerations

Serious discussion concerning the development of all such programs must, unfortunately, be prefaced with a word concerning finances. Any effort to extend the effective sphere of influence of the medical school must face the facts of budgetary handicaps in current training programs. The financial situation of the American medical schools is "desperate," according to the recent conference of the Council on Medical Education and Hospitals.[13] In a recent volume Allen[7] has declared that ". . . the medical schools of this country will need to double their budgets for teaching and research by 1960. . . ." Certainly, any significant progress in medical education depends upon far more adequate financial support.

In 1943 the most heavily endowed institutions had ten times the operating budget of the poorest schools, and expended six times as much per student.[52] Private endowments and foundation funds are diminishing. Tuition fees are at an all-time high and yet cover only 28 per cent of total costs.[13] In this situation, much consideration is being given to the advantage of federal and state aid for medical education and research. Ample precedents for such orderly, acceptable and "nonregimenting" public aid exist in the thirty-odd state-university medical schools and in the grant programs of the United States Public Health Service and the Veterans Administration. Without some source of increased funds, the schools will find it difficult to meet the vast challenges of the day.

There is much to justify the application of public resources to the training of professional personnel. Medicine is being increasingly recognized as a "social" as well as a "natural" science — a discipline that must be as devoted to the protection of the health of the community as to the care of the sick individual. As health administrators, as advisers to statesmen, educators and law courts and as attendants in every phase of community life, physicians must fulfill an ever-expanding public role. New trends in medical-care planning, in industrial health programs and in international organizations call for even greater numbers of publicly responsible doctors. It does not seem inappropriate, therefore, that society assume a share of the responsibility for training these kinds of physicians, and that the medical school devote itself actively to the broad social orientation of its students and to the promotion of the highest standards of medical service throughout the region. A medical school endeavoring to serve as the focal point of a regional medical-care plan that involves care of welfare clients, co-ordination with public agencies and general service to the community would logically qualify for public financial assistance.[51]

The democratic principle of full and equal opportunity for persons from minority and economically underprivileged groups who wish to study medicine is, of course, another powerful justification for such aid. Only through more adequate financing of medical schools can adequate scholarship grants and loans become available to those now unable to overcome the financial barriers to medical education.

The Medical School of the Future

The portrait of the new university medical school can now, perhaps, be drawn. Basically a service to the entire community, such a medical school will exist as the hub of a network of interrelated hospitals and health centers extending to the most isolated districts. Co-ordination with public-health and private-health and medical-care agencies will reflect the co-operative relations fostered between physicians and other health personnel. The students, chosen on the basis of broad academic preparation, demonstrated intellectual ability and qualities of personal integrity, will train in unified and noncompartmentalized courses that give adequate stress to the social and economic implications of modern medicine. Graduate and postgraduate educational programs will bring the knowledge of recent advances to local practitioners and afford younger residents some experience with the problems of rural and urban extrahospital practice. Research activities will continually elevate the standards of service. Through the co-ordinated network of medical facilities, the school will participate directly in the promotion of health and the provision of medical care throughout the area. Augmented public and private financial support to medical teaching centers will demonstrate an increased awareness of the broad social values that will accrue.

Thus, teaching centers may contribute effectively, continuously and lastingly to the quality of the medical service that is rendered to the people.

References

1. Weiskotten, H. G. Current problems in medical education. *J. A. M. A.* **133**:1045, 1947.
2. Cited in The Official Report of the Medical Care Commission on the Expansion of the Medical School of the University of North Carolina, Raleigh, 1947. P. 60.
3. Davison, W. C. Future of medical education. *J. A. Am. M. Coll.* **21**:223-235, 1946.

4. Atchley, D. W. Orientation of undergraduate medical curriculum. *Science* **104**:67-70, 1946.
5. New York Academy of Medicine, Committee on Medicine and the Changing Order. *Medicine in the Changing Order.* 240 pp. New York: Commonwealth Fund, 1947. Pp. 126-128.
6. Sigerist, H. E. Trends in medical education: program for new medical school. *Bull. Hist. Med.* **9**:177-198, 1941.
7. Allen, R. B. *Medical Education and the Changing Order.* 142 pp. New York: Commonwealth Fund, 1946.
8. Sheehan, D. Medical education of future. *M. Woman's J.* **51**:17-23, 1944.
9. Greene, J. A. Coordination of clinical teaching: methods and results of experiment. *J. A. Am. M. Coll.* **20**:129-134, 1945.
10. Eadie, G. S., and Davison, W. G. Postwar medical education. *J. A. Am. M. Coll.* **20**:1-11, 1945.
11. Carpenter, C. C. Experiments in medical education and medical care in new medical school. *South. M. J.* **39**:515-518, 1946.
12. Wearn, J. T. Challenge of functional disease. *J. A. M. A.* **134**:1517-1520, 1947.
13. Cited by Valentine, A. Privately endowed medical school. *J. A. M. A.* **137**:1-5, 1948.
14. Ackerly, S. Teaching of psychiatry to undergraduate medical students. *J. A. Am. M. Coll.* **18**:167-173, 1943.
15. Association of American Medical Colleges. Final report of Committee on Teaching of Preventive Medicine and Public Health. *J. A. Am. M. Coll.* **20**:152-165, 1945.
16. Dublin, T. Experiment with social approach. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 101-106.
17. Ministry of Health, Department of Health for Scotland. *Report of Inter-departmental Committee on Medical Schools.* 312 pp. London: His Majesty's Stationery Office, 1944.
18. LeBlanc, T. J. Community obligations of preventive medicine. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. P. 57.
19. Grant, J. Toward health — certain trends. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 7-17.
20. Stern, J. Medical student view-point. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. P. 163.
21. Association of Interns and Medical Students. Replies to questionnaires on medical education, July, 1945.
22. Leavell, H. R. Teaching of preventive medicine. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 23-40.
23. Means, J. H. Clinical teaching of social medicine. *Bull. Johns Hopkins Hosp.* **98**:96-111, 1946.
24. Goldmann, F. Teaching health economics in medical schools. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 173-176.
25. Gregg, A. Transition in medical education. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 18-22.
26. Cohen, E., and Derow, H. A. Teaching medical students objectives for care of patients and social aspects of illness. *Arch. Int. Med.* **56**:351-359, 1935.
27. Weaver, M. M. Teaching health economics in medical schools. In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 177-181.
28. Florio, L. How much time should be allotted to health economics? In *Proceedings of the Conference on Preventive Medicine and Health Economics.* 245 pp. Ann Arbor: University of Michigan School of Public Health, 1946. Pp. 197-201.
29. Pastore, J. B. *Medical Care Program.* Report to Committee on Future Plans of New York Hospital and Cornell University Medical College, New York, 1945.
30. Gregg, A. Addenda to agenda for decade 1940-1950. *J. A. M. A.* **114**:1138-1141, 1940.
31. Joint Committee of the Association of American Medical Colleges and the American Association of Medical Social Workers. *Widening Horizons in Medical Education.* 228 pp. New York: Commonwealth Fund, 1948.
32. Colwell, A. H. Social and environmental factors in medicine. *J. A. Am. M. Coll.* **19**:159-166, 1944.
33. Weiskotten, H. G. Experiment in medical care: outgrowth of teaching exercise in clinical medicine. *J. A. Am. M. Coll.* **19**:159-166, 1944.
34. Grant, H. G. Influence of social and economic factors upon illness and its prevention. *J. A. Am. M. Coll.* **18**:291, 1943.
35. Kracke, R. R., and MacQueen, J. W. Developments in Medical College of Alabama. *South. M. J.* **39**:8-12, 1946.
36. Arestad, F. H., and Westmoreland, W. G. Hospital service in United States: report of Council on Medical Education and Hospitals, of American Medical Association. *J. A. M. A.* **133**:1065-1154, 1947.
37. Arestad, F. H., Reid, E. K., and Leveroos, E. H. Approved internships and residencies in United States. Annual Report of Council on Medical Education and Hospitals of American Medical Association. *J. A. M. A.* **137**:23-89, 1948.
38. Jensen, F., Weiskotten, H. G., and Thomas, M. A. *Medical Care of the Discharged Hospital Patient.* 94 pp. New York: Commonwealth Fund, 1944.
39. Mountin, J. W., Pennell, E. H., and Hoge, V. M. *Health Service Areas: Requirements for general hospitals and health centers.* 68 pp. United States Public Health Bulletin No. 292. Washington, D. C.: Government Printing Office, 1945.
40. United States Senate Committee on Education and Labor, Subcommittee on Wartime Health and Education. *Interim Report* No. 3, United States Senate, 78th Congress, 2nd Session, pursuant to S. Res. 74, Washington: January, 1945. Pp. 10-17.
41. Commission on Hospital Care. *Hospital Care in the United States: A study of the function of the general hospital, its role in the care of all types of illness, and the conduct of activities related to patient service, with recommendations for its extension and integration for more adequate care of the American public.* 631 pp. New York: Commonwealth Fund, 1947. P. 23.
42. Proger, S. Medical education and care. *Hospitals* **20**:48-54, 1946.
43. *Idem.* Distribution of medical care: postgraduate program to fit pattern of medical practice. *J. A. M. A.* **124**:823-826, 1944.
44. Council of Rochester Regional Hospitals. *The Regional Hospital Plan.* 79 pp. Rochester, 1946.
45. Bruce, J. D. Continuing professional education. In *Proceedings of the Annual Congress on Medical Education and Licensure.* 70 pp. Chicago: American Medical Association, 1938. Pp. 34-38.
46. Committee on Graduate Medical Education. *Graduate Medical Education.* 303 pp. Chicago: University of Chicago Press, 1940.
47. New York University, *The Regional Hospital Plan of the New York University College of Medicine,* 1947-48.
48. Colorado State Medical Society, Colorado State Hospital Association, Colorado University. *Proposed Three Year Residency in the Field of General Practice,* Denver, Colorado, December 1, 1947.
49. New York State Health Preparedness Commission. *Planning for the Care of the Chronically Ill in New York State — Regional Aspects.* 85 pp. Albany: Williams Press, Inc., 1946.
50. Official Report of the Medical Care Commission on the Expansion of the Medical School of the University of North Carolina, Raleigh, 1947.
51. Long Island College of Medicine. *Bringing Modern Medicine to the People.* 64 pp. Brooklyn: Privately published, 1947.
52. Dolman, C. E. *Report on a Survey of Medical Education in Canada and the United States.* 53 pp. Vancouver: University of British Columbia, 1946.

THE EFFECT OF DICUMAROL ON THE ERYTHROCYTE SEDIMENTATION RATE IN NORMAL MEN*

JAMES L. PALMER, M.D.,† AND SVEN M. GUNDERSEN, M.D.‡

HANOVER, NEW HAMPSHIRE

OUR interest in the possible effect of dicumarol [3, 3'-methylenebis (4-hydroxycoumarin)] on the erythrocyte sedimentation rate in human beings was aroused when we began to use the drug in an increasing number of cases of acute myocardial infarction. Experience suggested that the sedimentation rates in the patients receiving dicumarol remained elevated over a longer period than would otherwise have occurred, especially when judged in terms of general clinical progress. As is well known, the sedimentation rate is one of the most valuable of the available tests in following the course of these patients. When the question of the influence of dicumarol on this test was raised, we had no answer for it, and were unable to find a satisfactory answer in the literature.

Current opinion holds that the erythrocyte sedimentation rate is determined in large measure by the various fractions of the plasma proteins. Since dicumarol affects the level of at least one of these fractions — that is, prothrombin — it seemed logical to assume that it might in some manner affect the sedimentation rate. Barker[1] stated in 1945 that dicumarol probably increased the sedimentation rate, but he now believes that it probably does not.[2] Because of the dearth of information on the subject, we decided to test the effect of the drug on the sedimentation rate of normal persons.

TABLE 1. *Data before the Administration of Dicumarol.*

SUBJECT	AGE	RED-CELL COUNT	HEMOGLOBIN	WHITE-CELL COUNT	BROMSULFALEIN RETENTION		INITIAL SEDIMENTATION RATE
					AT END OF 45 MIN.	AT END OF 60 MIN.	
	yr.		gm./100 cc.				mm./hr.
R. A. H.	20	4,830,000	14.8	6,000	0	0	1
L. N. P.	21	5,000,000	15.5	7,700	0	0	2
C. S.	21	5,0 0 000	14.3	6,400	0	0	2
W. D. W.	23	5,600 000	15.3	8,300	0	0	1
D. M. W.	27	5,500,000	15.7	10,000	0	0	1

TABLE 2. *Prothrombin Concentrations and Sedimentation Rates after the Administration of Dicumarol.*

DATE	R. A. H.		L. N. P.		C. S.		W. D. W.		D. M. W.		CONTROL	
	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE	PROTHROMBIN CONCENTRATION	SEDIMENTATION RATE
	%	mm./hr.	%	mm./hr.	%	mm./hr.	%	mm./hr.	%	mm./hr.	%	mm./hr.
5/12/48	90	1	94	2	84	2	79	1	92	1	83	—
5/13/48	84	1	85	2	82	3	72	1	80	2	76	3
5/14/48	70	2	31	2	57	2	42	1	48	3	87	2
5/15/48	34	1	41	2	36	2	28	2	25	1	87	2
5/17/48	20	2	17	2	21	2	23	2	21	1	87	2
5/18/48	21	1	18	2	19	2	22	1	22	1	85	3
5/19/48	24	1	20	2	25	2	24	1	24	2	80	2
5/20/48	26	1	21	2	24	2	25	1	25	2	83	2
5/21/48	22	5	19	2	22	2	24	2	23	2	83	—
5/22/48	21	2	19	2	20	3	19	1	19	1	83	3
5/24/48	21	2	17	1	19	—	21	1	22	2	85	—
5/25/48	21	1	19	2	19	2	19	1	19	1	83	2
5/26/48	23	2	21	3	21	—	20	1	24	1	85	3
5/27/48	21	1	22	4	20	5	20	1	22	2	83	5
5/28/48	22	1	23	8	20	5	22	1	25	4	80	4
5/29/48	24	2	21	9	21	5	21	1	28	3	83	4
5/31/48	20	1	19	10	21	2	21	2	30	2	85	13
6/ 1/48	20	7	19	4	23	3	19	1	40	—	74	3
6/ 3/48	22	2	25	5	25	3	20	2	32	3	80	—
6/ 4/48	21	2	21	4	21	3	20	3	28	2	76	3
6/ 5/48	24	2	23	3	24	2	22	2	24	1	83	9

METHODS

Five healthy medical students volunteered as subjects. On each a thorough history was taken,

*From the laboratories of the Mary Hitchcock Memorial Hospital and Dartmouth Medical School.

†Resident in medicine, Mary Hitchcock Memorial Hospital.

‡Physician, Mary Hitchcock Memorial Hospital and Hitchcock Clinic.

and a physical examination performed. All were found free of a history of liver disease and of significant physical abnormalities. Blood counts, a bromsulfalein excretion test (using 5 mg. of dye per kilogram of body weight) and an initial sedimentation rate were found to be normal in all (Table 1). Also, routine urinalysis on each subject was entirely normal.

On completion of these examinations, each subject was put on a daily dose of dicumarol. Daily prothrombin times were determined on the undiluted plasma of each, with the use of thromboplastin prepared in our laboratory from human brain by a method derived from the Quick[3] acetone extraction technic. The prothrombin concentrations were maintained, so far as possible, between 30 per cent and 10 per cent of mean normal, since these are the levels most commonly accepted as the limits of therapeutic range. All subjects tolerated the drug well, and were carried on it for twenty-five consecutive days. The sedimentation rates were determined on twenty-one of the twenty-five days, by the use of the Westergren method, in which the upper limit of normal in male subjects is considered as 15 mm. per hour, and 4 mg. of potassium oxalate and 6 mg. of ammonium oxalate per each 5 cc. of blood being used as anticoagulant.

Results

In none of the 5 subjects was there an elevation of the sedimentation rate above the upper limits of the normal range (Table 2).

Summary

The results of this study indicate that dicumarol administered in therapeutic dosage for twenty-five consecutive days has no significant effect on the erythrocyte sedimentation rate in normal men. It is possible that the results of this study cannot be applied to the interpretation of the effect of dicumarol on the sedimentation rates of patients with associated diseases that are known to affect the sedimentation rate.

References

1. Barker, N. W. Clinical use of dicoumarol. *M. Clin. North America* **29**:929-935, 1945.
2. *Idem.* Personal communication.
3. Quick, A. J. Nature of bleeding in jaundice. *J. A. M. A.* **110**:1658-1662, 1938.

MEDICAL PROGRESS

OTOLARYNGOLOGY

Carlyle G. Flake, M.D.*

BOSTON

IT IS the purpose of this review to present in summarized form certain papers on subjects of current concern in the field of otolaryngology and others that may be of more general interest. These papers appeared in the literature for the year 1947.

The Ear

Fenestration Operation

Moorhead[1] reported a series of 123 patients upon whom the fenestration procedure had been performed. The results were estimated on the basis of audiometer readings taken at 512, 1024 and 2048 cycles. In this group 29 per cent of patients failed to recover satisfactory hearing for any of the three tones. Forty-seven per cent recovered serviceable hearing with perception at the 30-decibel level or better for all three tones. Fifteen per cent improved to the extent that their threshold for two or three tones reached the level of 30 decibels or better. In general, 76 patients (62 per cent) were classed as having had successful results. The two main causes cited for poor results in suitable patients were: closure of the new window by formation of new bone or by the development of fibrous tissue, or both; and secondary postoperative serous labyrinthitis. No deaths occurred in this series, and although 2 patients developed facial paralysis, this complaint was transient.

From the many reports of the fenestration operation that have appeared in the literature, it becomes evident that satisfactory results may be achieved in a sufficiently high percentage of cases to warrant the operation in suitable patients. According to Lindsay[2] the three problems that remain to be solved are: the establishment of criteria for assessing the possibilities of improvement in each case; the maintenance of a fenestra that will give maximum function; and the prevention of injury to the sense organ of the ear as a result of the operation. In Lindsay's experience, patients most suitable for operation are young persons with relatively

*Instructor in laryngology, Harvard Medical School; chief, Division of Otolaryngology, Children's Hospital; otolaryngologic surgeon, Peter Bent Brigham Hospital.

better hearing for high tones than for low tones and a bone-conduction threshold within the normal range up to the 4000-cycle frequency or beyond. The hearing in this type of patient may, postoperatively, reach within 15 decibels of normal in the speech frequencies. The main problem in estimating bone conduction in otosclerosis arises when there is much asymmetry between the two sides. The bone-conduction threshold is then likely to reflect the better ear unless masking is adequate. It is questionable whether masking can be reliably carried out for bone-conduction sounds. It is also questionable whether an air-conduction hearing loss of over 60 decibels can occur without some impairment of the perceptive apparatus. In the series of cases reported the consistent finding of a depressed threshold for bone-conducted sound proved to be a reliable indication of the possible failure to obtain adequate and permanent improvement by fenestration. The possibility of improvement in speech perception appears to be most accurately indicated by the preoperative bone-conduction threshold values of 2048 and 1024 cycles.

Deafness

Occupational

MacLaren and Chaney[3] found, in a noise survey in an industrial plant, that sounds at levels of above 100 decibels are common in metal fabrication and that riveting is an important source of half this noise. Industrial noise also appears to be of the broad-spectrum variety, without prominent frequency peaks or narrow frequency bands. The borderline between relatively harmless noise and that which produced steady deterioration was found to lie in the region of 100 decibels. An analysis of 5000 audiograms made on workers in an airplane manufacturing plant showed that certain types of hearing loss increased greatly in the presence of intense noise. The greater portion of hearing loss took place within a few days or even a few hours of exposure and, at first, involved frequencies above 2048 cycles per second. Later, the loss extended to lower frequencies but at a much slower rate. After removal from the noise the lower tones were the first to return, followed by recovery of the high tones provided the damage had not been too great. In every group there were persons who did not show acoustic trauma even at the highest level encountered; fewer such cases were found as the noise intensity rose. Ear protectors that attenuated the higher frequencies, enough to bring over-all loudness below 100 decibels, allowed a measure of recovery from the trauma. The presence of conductive deafness did not seem to be an important factor in relation to development of occupational deafness. It was thought that the defect of conduction might result in some protection to the cochlear mechanism and that persons with this form of hearing loss probably do not need to be excluded from noisy areas. As a preventive measure the authors recommended that when noise levels regularly exceed 100 decibels pre-employment audiograms be obtained; audiometric studies should be repeated at monthly intervals until it is determined what sort of equilibrium the employee can attain. Progressive deafness after six months calls for transfer to quieter surroundings. Should an early marked loss appear in the region below 2048 decibels, the worker should be removed to a quieter place.

Rubella

Further confirmation of the results of maternal rubella in producing deaf mutism in the offspring is reported from England by Clayton-Jones.[4] In a small school with 18 children the mothers of 8 gave a definite history of rubella in the second to fourth month of pregnancy; 1 mother gave a probable history. All the 8 children were born between August and October, 1940. In three larger schools a history of rubella was obtained from the mothers of 11 of 123 children. The 11 children were born between October, 1940, and February, 1941. Deafness noted in these children was bilateral and of the inner-ear type. It was incomplete and usually fairly uniform throughout the frequency range. Difficulty in feeding during infancy was commonly reported, and examination showed a tendency to deformity of the jaw, pigeon chest and atonic musculature. Intelligence appeared to be unaffected. No cataract or definite heart lesion was detected. The health records of the city of Manchester, England, show that the rubella epidemic of 1940 was peculiar in that an unusually high proportion of young women were affected.

Pre-School

Goodhill[5] states that hearing tests in children are based on psychologic principles since audiometry is useless up to the age of three and of limited value in children three to four years of age. Young infants are examined by the eye-reflex test. Various sounds are made by an assistant, who stands behind the child while the latter's attention is diverted. Hearing is indicated by involuntary blinking or jerking of the eyeball. The attention of a child two or more years old is diverted, and his name called in various tones. Hearing is demonstrated by eye responses or turning of the head toward the sound. Drums, whistles, bells and other sound-producing sources are used to test the frequency-response ranges, or a frequency-modulated loud speaker may be used. It is important that vestibular function be estimated in children who do not respond to sound stimuli, to detect possible hearing islands that may be amplified by a hearing aid in future training. The Kobrak cold-stimuli test can easily be done even on an infant. A normally active response indicates that the vestibular neurologic

mechanism is intact and that the cochlear mechanism is not necessarily lost, for hearing islands may develop later in such patients. Deafness in children should be diagnosed, and the educational treatment started before three years of age. Even the completely deaf child can be taught lip reading and effective speech, and the use of a hearing aid enables those with some residual hearing to learn intelligible and not unpleasant speech. It has been proved practicable to teach an entirely deaf child about 1350 words so that he can speak 500 or 600 words when ready for the first grade. Oral communication is now recognized as the only rational approach for the deaf child. Lip reading is being replaced by speech reading because the development of speech is almost impossible without it. Effort is made to teach the deaf child to read the play of expressions on speakers' faces in terms of concept. The child must learn to hear with his eyes and reply in speech. The parents of deaf children must be taught to treat their children as normal and talk to them as much as possible.

Pellagra

Observations made on the effects of starvation diets in a group of prisoners of war in Java, Batavia and Sumatra were reported by de Raadt.[6] From an otoneurologic viewpoint the chief symptoms were vertigo, nystagmus, headache, hearing impairment and weakness of lateral gaze and of conversion. Of 160 patients showing this syndrome, 101 complained of dizziness. Of the latter, 39 had typical rotary labyrinthine vertigo. The attacks varied in intensity and lasted from a few minutes to several days. At times the additional symptoms of nausea, vomiting, tinnitus and deafness were present. Profuse sweating and headache were often noted. Nystagmus was always present, generally of the first degree and in both directions. All forms of dizziness, especially the rotary vertigo, were initiated or increased by conjugate movement of the eyes. Forty-five patients complained of deafness, which was generally moderate and not annoying. One prisoner of war with perfect hearing when he entered the camp became totally deaf for conversational voice but subsequently almost completely recovered his hearing when nutritional conditions improved. Studies showed that the lesion in these patients was localized to the brain stem and that pellagra was the causative factor. The symptom complex observed was an early manifestation of that disease. It was suggested by de Raadt that any patient showing idiopathic vertigo of central origin should receive anti-pellagra therapy until the origin of the vertigo was determined.

Associated Keratitis

Lewis[7] reported a clinical syndrome occurring in three young women and consisting of bilateral acoustic neuritis associated with interstitial keratitis. Allergy, dietary deficiency, syphilis and other chronic diseases were ruled out. In each patient the syndrome was characterized by a nonsyphilitic interstitial keratitis, vertigo, tinnitus and deafness. The acoustic neuritis terminated after a few months in complete bilateral nerve deafness and loss of vestibular function. The keratitis did not change appreciably in a year. The etiology was not determined, and the possibility of a virus infection could not, therefore, be excluded. In 1 patient cervical sympathetic ganglionectomy was performed early in the course of the disease without beneficial effect.

Multiple Sclerosis

Hearing defects in patients with multiple sclerosis were studied by Von Leden and Horton.[8] Fifty-seven per cent of a series of 92 patients had normal hearing, whereas the remainder showed a measurable degree of deafness (25 decibels or more) in one or both ears. Of a similar group of normal healthy subjects tested under the same standard conditions, 18 per cent showed slight changes in auditory acuity in contrast to the varied changes found in 43 per cent of the patients with multiple sclerosis. Different types of auditory involvement were noted, including moderate to severe unilateral field defects up to 70 decibels. The decreased hearing in the speech range did not extend beyond the critical level of 70 decibels. This retention of hearing in the conversational range accounts for the fact that only 12 patients complained of poor hearing and that only 7 of these actually had defective hearing. This dissociation of subjective and objective disturbances is characteristic of multiple sclerosis. No relation appeared to exist between the hearing impairment and the severity of the disease. It was noted that disturbances of vestibular function provide a fairly accurate indication of changes in the patient's general condition.

The Labyrinth

Streptomycin

A series of 81 patients from a large military hospital who had been treated with streptomycin for a variety of diseases were examined by Fowler and Seligman[9] for evidence of changes in the hearing and vestibular function. Those with known disease of the ear were excluded from the study. The diseases for which streptomycin had been given included osteomyelitis (71.6 per cent of cases), urinary infections (16.3 per cent) and miscellaneous conditions. The daily dose was usually 3 gm. of streptomycin administered intramuscularly in divided doses. Total individual dosage was small in comparison with that given in tuberculosis and ranged from less than 10 gm. to 49 gm., although 1 patient received a total of 141 gm. The interval between cessation of treatment and the initial otologic examination varied from one day to six months. Fifteen of the patients

were examined before and after therapy. Of the 81 patients studied, 42 showed a high-tone loss alone. Eleven patients showed a low-tone as well as a high-tone loss. The high-tone losses ranged from 30 to 100 decibels in the frequencies of 2896, 4096 and 8192. The authors believe that these were due to acoustic trauma. Many patients with appreciable high-tone loss gave a history of shell bursts nearby. The 15 patients examined before streptomycin therapy showed similar high-tone losses. Caloric tests after streptomycin therapy revealed a normal response in 65 patients. There was delay in one or both sides in 13 patients. Three patients showed absence of nystagmus after irrigation for five minutes with ice water. Two of these had a persistently negative and one a persistently positive Romberg sign. Two of these patients later showed recovery of the vestibular response.

Vertigo

McNally[10] defines vertigo as a consciousness of discord in the postural mechanism. The maintenance of this mechanism is the main function of the labyrinth. Vertigo may be ocular, central or labyrinthine in cause. These origins are differentiated by the history, description of the vertigo and associated signs and symptoms. In labyrinthine vertigo there may be evidence of disease of the cochlear mechanism, such as deafness and tinnitus. Positional nystagmus may be present. Nystagmus is normally associated with labyrinthine stimulation. In some cases spontaneous nystagmus may occur only when the head is in a certain position. This type of nystagmus is known as positional, and the utricle is probably responsible for it. The presence of positional nystagmus aids in diagnosing pseudo-Ménière's disease. After removal of a cerebral hemisphere in a rabbit, any labyrinthine stimulation that produced a nystagmus toward the side of the brain lesion elicited a greater reaction than a stimulus that produced a nystagmus in the opposite direction. This phenomenon is called directional preponderance and may be of utricular origin. It has been said to occur only in temporal-lobe lesions, in man. The utricle may be concerned in reflex adaptation of posture to the field of gravity. Its function, however, cannot be the steady holding of posture. It helps to break up an existing postural debt and to impose a physiologically more suitable one.

According to Lindsay,[11] vertigo arising from disease of the central nervous system, such as encephalitis, abscess, tumor or multiple sclerosis, is the result of direct involvement of the vestibular nuclei or pathways or of pressure. The vertigo following head injury with concussion is probably central in origin if unaccompanied by auditory disturbance. As a toxic manifestation in the course of some respiratory and gastrointestinal infections, vertigo occurs frequently but without deafness or tinnitus. It may also occur in cerebral arteriosclerosis and hypertension, as well as in hypotension and during the menopause. The localization is indefinite, but the absence of auditory symptoms suggests that it is central, and the pathologic disturbance is mild and reversible. When deafness and tinnitus occur with vertigo the lesion can be localized in the peripheral labyrinth or eighth nerve. In the past the most frequent cause has been a labyrinthitis from the extension of meningitis or inflammatory disease in the temporal bone. A disturbance of the peripheral labyrinth may occur from several other causes, such as nonsuppurative otitis media, virus diseases and, rarely, extrinsic allergy. The sudden onset of tinnitus, deafness and vertigo in a patient with a previously healthy ear leaves a profound and permanent impairment of function. Should this occur in middle life or later it is considered to be due to a vascular accident in the labyrinth. Similar episodes sometimes occur before middle age, and it may be impossible to differentiate these from an acute toxic process. A toxic disturbance affects auditory function primarily. However, it may not impair vestibular function. Precise pathological information in this type of labyrinthine lesion is not available. A fibroserous labyrinthitis may occur in the late stages of leukemia and is thought to be the result of hemorrhage in the labyrinth. The clinical condition known as Ménière's disease, which is characterized by recurring attacks of vertigo with fluctuating tinnitus and deafness, is now known to be associated with hydrops of the labyrinth. This type of hydrops is distinguishable from that which sometimes occurs in inflammatory disease of the inner ear, since in the former there are no inflammatory changes in the perilymphatic spaces and degeneration of the peripheral cochlear neuron is usually absent. The etiology is not known.

Ménière's Disease

Cawthorne[12] reported a study on a series of 424 patients with Ménière's disease. Excluded were all patients who gave a history of otitis media or in whom an inflammatory process within the labyrinth was suspected, those in whom attacks were induced by sudden head movements, those with dizziness due to cardiovascular disease and those with anxiety neuroses. The general picture of the disease followed the usual pattern of periodic bouts of paroxysmal vertigo accompanied by nausea and vomiting. Some degree of nerve deafness with tinnitus was present and was always more noticeable on one side. No other signs of central-nervous-system disease were evident. The attacks varied greatly in all respects even in the same patient. The attacks tended to occur in groups, usually several within a short period followed by long intervals of freedom. Physical activity did not appear to influence the onset. Many attacks occurred at

night or during periods of inactivity. Warning of an impending attack, which was noted in about 50 per cent of the patients, took the form of an alteration in the character of the tinnitus or deafness and, in some patients, of a feeling of fullness or numbness behind the affected ear. Vertigo was the major symptom and consisted of a sensation of movement of surrounding objects — less commonly, of the subject himself rotating. Duration of the attacks varied from a few moments to several days, and in severity from momentary inconvenience to helplessness. Unconsciousness occurred in only 2 cases. The caloric test rarely failed to reveal a lack of balance between the two labyrinths, the commonest finding being a depression of function on the side of deafness. In approximately 10 per cent of the patients in this series the caloric test revealed definite bilateral vestibular involvement. Medical treatment was given a trial in all cases and in the majority was sufficient to control the attacks. Phenobarbital and small doses of hyoscine were often helpful in modifying the attacks. Exclusion of salt and salty foods from the diet together with the limitation of fluid intake offered more relief than any other form of conservative treatment. When the attacks could not be controlled by medical means, surgical ablation of the offending labyrinth was carried out in patients in whom only one vestibular labyrinth was affected. This procedure was employed in 116 patients without any untoward operative results. After operation some residual dizziness, particularly on sudden head movements, was generally experienced. However, most patients were well enough to return to work within a period of two months of their operation.

Since various conditions causing vertigo are difficult to differentiate, Williams[13] suggests that a diagnosis of endolymphatic hydrops (Ménière's disease) should not be made until certain diseases and conditions have been ruled out. These are as follows: the presence of impacted foreign bodies or inspissated serum in the external auditory canal; obstruction of the eustachian tube on the affected side; multiple sclerosis; and Brun's syndrome of occlusion of the fourth ventricle by cysticercosis. The methods of medical treatment that have succeeded in relieving symptoms of endolymphatic hydrops have been based on the conception that this condition is a form of allergy. In acute attacks a few minims of epinephrine given intravenously have proved effective, as have rather large doses of atropine (0.86 mg.). Benadryl has been found moderately effective in some patients. Williams has found that with either nicotinic acid or histamine results superior to those obtained by controlling water and electrolyte metabolism may be obtained. However, there is no obvious reason why these various methods should not be combined. It was therefore suggested that the total fluid intake be limited to 3000 cc. daily, preferably less, that care be taken that the drinking water does not contain excessive amounts of the sodium ion and that salty foods and the addition of salt to cooked foods be avoided. Potassium nitrate, 1 or 2 gm. in enteric-coated tablets, is given three times a day with meals, and nicotinic acid is administered subcutaneously, starting with 25 mg. and increasing by this amount with each injection until a dose that relieves symptoms is reached. In most instances this has been found to be 100 mg. However, some patients are unable to tolerate this amount, whereas others may require doses as high as 200 to 300 mg. daily. Treatment with the vasodilators should not be continued longer than six months, without a rest period of several weeks, since many of the vasodilators lose their efficiency when administered for longer periods. On this regimen and with judicious psychiatric treatment to relieve the anxiety-tension state, approximately 80 per cent of patients were relieved of their symptoms. In cases in which all types of medical treatment had failed, ablation of the labyrinth has proved the most effective treatment.

The vertigo[14] of Ménière's disease (labyrinthine hydrops) is so characteristic that it should not be confused with any other type. The typical symptom is a violet vertiginous seizure, which is paroxysmal and disabling. In contrast the vertigo in intracranial disease is more in the nature of a swimming, giddy or unsteady feeling, present most of the time but aggravated by sudden motion. Vertigo may be produced by organic central-nervous-system lesions. Such lesions are usually associated conspicuously with other clinical evidence of intracranial disorder; cerebellopontile-angle tumor is a classic example. Vertigo may be the symptom of a toxic condition. Evidence for this statement is in the occurrence of vertigo in septic patients after treatment with certain drugs such as the antibiotic streptomycin. It is often a manifestation of a nervous depression. There may be a large psychic factor in typical labyrinthine hydrops although it is probably the effect and not the cause of this syndrome. A vascular accident within the otic labyrinth may be the cause of an explosive attack of vertigo with a roaring noise in one ear, nausea, vomiting and unilateral deafness. All symptoms except the hearing impairment spontaneously disappear. Vertigo is occasionally seen in hypertensive disease. After splanchnicectomy in a series of 37 patients, most of the patients showed a marked decrease in hypertension and a disappearance of the associated vertigo. Symptoms of headache, dizziness, tinnitus and nervous irritability aggravated by fatigue and emotion are evidence of hypertensive disease and warrant the determination of the blood presssure at varying intervals.

Otitis Media

Allergic Otitis

In a series of 222 patients with manifest chronic otitis media, Koch[15] found that in 41 the secretion

from the ear contained many eosinophils. This group was classified as eosinophilic chronic otitis media. The other patients were classified as of the aneosinophilic type. The macroscopic appearance of the mucosa of the middle ear was strikingly different in the two types. It was slightly or moderately swollen in the aneosinophilic cases. In eosinophilic chronic otitis media on the other hand, the mucous membrane was always edematous and usually pale, with cyanotic areas similar in appearance to the mucous membrane of the nose in vasomotor rhinitis. The secretion was so viscid that often it had to be removed with forceps. Histologically the mucous membrane of the ear in the aneosinophilic cases showed chronic inflammation with round-cell infiltration dominated by lymphocytes and plasma cells. In the eosinophilic group the secretion showed clumps of eosinophilic leukocytes when stained and examined under the microscope. In the aneosinophilic group the microscopical picture of the secretion was wholly dominated by neutrophilic leukocytes interspersed with lymphocytes and monocytes. Healing of the ear was considerably longer in patients with eosinophilic otitis media, and associated allergic nasal symptoms were also more frequent in these patients. Bacteriologic investigation showed that the staphylococci were the commonest organisms in both eosinophilic and aneosinophilic otitis. *Proteus vulgaris* and coliform bacteria were especially common in aneosinophilic otitis. Twenty-seven patients with eosinophilic otitis were successfully treated by elimination of suspected allergins or desensitization, or both.

Sinuses

Frontal Sinus

In acute fulminating frontal sinusitis early trephining is important to prevent extension of infection beyond the confines of the sinus. Goodyear[16] uses a curved incision below the eyebrow and after incision of the periosteum an opening is made in the bone with a nail trephine almost at right angles to the sagittal plane of the nose, medial to the suprafrontal notch and just posterior to the medial orbital ridge. The cavity may be irrigated with warm saline solution to which penicillin has been added. A drain may be placed in the wound and removed in forty-eight hours. In acute frontal sinusitis when the size of the nasal chamber permits, the anterior ethmoid cells are opened, and those around the frontal ostium removed. The curet then enters the frontal sinus and allows evacuation of pus. This intranasal approach may also be used in chronic frontal-sinus infection. The depth and width of the affected sinus, as shown by roentgenograms, are important in deciding on the intranasal approach. When failure has occurred an external procedure becomes necessary. The Jansen–Lynch operation with the use of a self-retaining gold tube is advised in all osteomas of the frontoethmoid area when suppuration is present. This tube may be left in place for life.

Subdural Empyema

Subdural empyema[17] may follow the initial attack of frontal sinusitis, or it may occur during an acute exacerbation of chronic frontal-sinus disease. In most cases infection is probably conveyed by way of perforating veins that extend from the frontal-sinus mucosa to the dura. The course of the disease is frequently short, and the period of survival may be only a few days. Headache, stiff neck, somnolence, Jacksonian convulsions and hemiparesis in a patient with frontal-sinus disease strongly suggest subdural abscess. Drainage is best accomplished thorough enlarged burr holes in the frontal, parietal and temporal regions, so arranged that thorough irrigation of the subdural cavity can be carried out. Drains are maintained in the subdural space for four to six days after operation. Death occurred in two of three patients with subdural infection secondary to frontal sinusitis within two weeks of the onset of cerebral symptoms, despite the use of antibiotics and supportive measures. The third patient recovered completely after early drainage.

Mouth and Pharynx

Congenital Cysts

According to New,[18] congenital cysts of the tongue, floor of the mouth, pharynx and larynx are rare and are difficult to diagnose and to remove completely. Repeated exacerbations due to infection may occur, and at such a time the cyst may rupture. After the discharge of the cyst contents, little can be found to account for the patient's symptoms. Uninfected cysts may cause no other symptoms than those due to increase in size. Ranula should designate only the thin-walled, epithelium-lined cyst, which is sometimes of a bluish tinge, fluctuates but does not pit on pressure and is soft and easily compressible. The cysts may be present at birth or may appear shortly afterward. Unless interference with breathing or eating is produced, immediate removal is not necessary. Complete surgical removal is the treatment of choice. Larger cysts may be treated by incision and destruction of the lining membrane with superficial surgical diathermy.

Cystic hygroma is a multilocular cyst usually found in the floor of the mouth or in the submental or submaxillary region. It is thin walled, has an endothelial lining and is usually filled with clear lymph. It is caused by obstruction or lack of development of afferent lymph vessels. Microscopically, cystic hygroma and lymphangioma cannot be distinguished, and the reaction of each to radium therapy is identical. Surgical removal is satisfactory if the patient can stand the operative

procedure. Repeated treatment with external radiation or radon seeds is effective and leaves only a small residual thickening or some superfluous skin, which may be excised later. Dermoid cysts occurred about the orbit, the floor of the mouth and the nose, in that order of frequency. In the floor of the mouth the cyst may be located above or below the myelohyoid muscle and tends to be spherical. The wall is thick, and, where it can be readily palpated, the cyst has a doughy feel. Complete surgical removal is advisable. Thyroglossal cysts are lined by stratified or ciliated epithelium. Treatment consists of the removal of the cyst or cystic tract in the interval between infections. Branchial cysts may be present in the lateral aspect of the pharynx in the region of the posterior pillar, below the tonsils and in the hypopharynx at the base of the tongue. The cyst opening may be further enlarged when suspension laryngoscopy is used, and the cystic tract can be destroyed with surgical diathermy using a protected point.

Larynx

Laryngotracheitis

From 1926 to and including the months of January and February, 1945, 549 patients with laryngotracheobronchitis were admitted to the Hospital for Sick Children, Toronto.[19] Over these years a steady increase in the number of admissions of patients with this disease was noted, and the seriousness of the illness in individual patients was in inverse proportion to the number admitted in any year. In 1928, of 8 children admitted, 6 died (a mortality of 75 per cent), whereas in 1944 the mortality was 9.2 per cent for 55 cases. The disease was particularly prevalent in children under the age of two years, 69 per cent of the patients being in this age group, whereas only 5 per cent were over six years of age. Over 70 per cent of the patients were admitted from November to April, the peak months were February and March. Organisms most frequently encountered were *Streptococcus haemolyticus*, *Staphylococcus aureus* and the pneumococcus; *Haemophilus influenzae* was seldom found. Many of the infections apparently were primarily due to a virus, and recognition of this was made by the lack of response to antibiotics, normal leukocyte count or leukopenia, failure to grow pathogenic bacteria from culture material taken from the site of the disease and a fairly typical clinical course. Superficial destruction of the mucosa was noted most often in *Staph. aureus* and *Str. haemolyticus* infections, and pseudomembranous inflammation was found most commonly in *Staph. aureus* infections. Regarding prophylaxis, it was the opinion of these authors that antibiotics should be used in every case of simple croup, for if they are given early enough the serious manifestations of bacterial infection will be prevented. If patients have virus infection the antibiotics will have little curative effect, but secondary infection is prevented and the incidence of serious postoperative complications reduced. Early tracheotomy is the operation of choice and intubation is recommended only as a temporary expedient to relieve obstruction. Bronchoscopic removal of secretion is frequently resorted to. The principal causes of death are failure to relieve obstruction, overwhelming toxemia, postoperative infection, pneumothorax and mediastinal emphysema. The mortality has been gradually reduced for the past twenty years. This has been most striking in the tracheotomized patients, in whom a reduction in mortality from 80 to 35 per cent was accomplished.

Influenzal Laryngitis

In children laryngeal infection caused by *H. influenzae* (Type B)[20] is rapidly progressive, and unless the disease is properly recognized and properly treated, death from toxemia and asphyxiation results. The clinical features of this rapidly developing infection are characterized by an abrupt onset. The child becomes fretful and, if old enough, complains of a sore throat and difficulty in swallowing. Respiratory distress with inspiratory retraction of the sternum and soft tissues, cyanosis, hoarseness and a croupy cough develop in extremely rapid progression. Patients are frequently limp and in shock, as shown by their ashen pallor. Children, particularly those under the age of two, are sometimes moribund within eight to twelve hours of onset. The temperature ranges from 100 to 104°F. The oropharynx is usually intensely red and edematous. Characteristically, the epiglottis and glottis are swollen and fiery red. No membrane is present, but exudate may or may not be present. The white-cell count is elevated to 15,000 or more with the differential count showing 80 or 90 per cent neutrophils. The diagnosis can be confirmed by the recovery of *H. influenzae* (Type B) in cultures from the nasopharynx, oropharynx, larynx, or blood. Catarrhal laryngitis and spasmodic croup present little difficulty in differential diagnosis since in neither condition is the toxicity so marked, the respiratory embarrassment so severe, or the symptoms so rapidly progressive. Although diphtheria and *H. influenzae* (Type B) laryngitis may resemble each other in their later stages, the onset is more insidious in diphtheria than in the former, and a typical membrane is usually present in the oropharynx or larynx from which diphtheria bacilli can be cultured. The three cardinal therapeutic measures in this type of laryngitis are: tracheotomy for relief of respiratory obstruction; administration of sulfadiazine and Type B *H. influenzae* rabbit antiserum — both specific agents against this organism, and given together, more effective than either alone; and parenteral administration of fluids to combat or prevent shock. There should be no hesitancy in performing trache-

otomy in children showing respiratory obstruction due to laryngeal edema with associated cyanosis and toxicity. Death results from a combination of mechanical obstruction to respiration and shock caused by the overwhelming infection, in addition to the anoxia produced by the respiratory obstruction.

Tracheotomy in Bulbar Poliomyelitis

Tracheotomy is a useful and often life-saving procedure in bulbar poliomyelitis.[21] In the epidemic in Minneapolis in 1946, 400 patients had the bulbar type of poliomyelitis. In this group tracheotomy was performed on 75 patients, of whom 29 survived. On the adult neurologic service at the University of Minnesota Hospital tracheotomy was performed on all patients with early bulbar symptoms, when the disease was progressing rapidly, when the respiratory or circulatory centers were involved or when severe toxic or mental changes were noted. At the Minneapolis General Hospital and the University Hospital Pediatric Service tracheotomy was performed on the following indications: respiratory distress as evidenced by recurrent cyanosis; coarse rales in the chest and laryngeal stridor; excitement and unmanageability causing the patient to resist pharyngeal aspiration; stupor sufficient to make the patient oblivious of the accumulation of secretions in his airway; inability to cough effectively; pharyngeal pooling of mucus; and vocal-cord paralysis or intralaryngeal hypesthesia demonstrable by laryngoscopy.

Tracheotomy gives the best chance for survival when performed before cyanosis occurs. Cyanosis can be detected clinically only when far advanced, by which time anoxia has done irreversible damage to a central nervous system already markedly damaged by the virus. Combativeness, confusion, disorientation, irrationality and coma can be symptoms of early anoxia as well as of polioencephalitis. Failure to recognize the cause of these symptoms may misdirect therapy. The use of a respirator in the presence of both bulbar and spinal-cord lesions may suck the pharyngeal secretions into the lower respiratory tract. Tracheotomy permits aspiration of this secretion from the trachea and bronchi. Sedatives must be used with great caution. Priest et al.[21] felt that tracheotomy has an important place in the treatment of bulbar poliomyelitis and cited 17 cases in which the operation was believed to be the vital factor in successful treatment.

Stenosis

In a series of 42 patients treated by Figi[22] for cicatricial stenosis of the larynx, fracture of the cartilages and previous removal of tumors were the most frequent causes of the stenosis. Less frequent causes were acute infection, self-inflicted and accidental severing of the trachea and the use of the nasal feeding tubes. In 27 patients the stenosis was treated by opening of the larynx and, when necessary, the trachea and by excision of the scar tissue. A core of air-foam sponge rubber covered with a moderately thin skin graft removed from a nonhair-bearing area was then placed in the larynx or trachea and immobilized by transfixing with two silver alloy wires threaded on a long needle and passed directly through the skin, underlying soft tissues and thyroid cartilage, or between the tracheal rings. The rubber mold was removed at the end of ten days. Usually, the grafts took perfectly. Subsequent dilatation depended on how much cartilage was destroyed by the process that primarily induced the stenosis. If there was no appreciable destruction of cartilage and the stenosing scar was completely excised before the skin graft was applied, dilatation as a rule was not required for more than two or three weeks at most. Return of vocal function depends on the extent of loss of soft tissue and is unpredictable. When extensive destruction has occurred and the vocal cords, ventricular bands and arytenoid cartilages are not recognizable, the likelihood of restoration of voice is remote and the advisability of an attempt at surgical correction questionable. If the sphincteric action of the superior laryngeal orifice is lost, postoperative difficulty is encountered because of the tendency for food and fluid to gravitate into the trachea and lungs. In a patient with this condition after operation it became necessary to reproduce the stenosis because of difficulty in eating and drinking. Of the 27 patients treated by skin grafting, 24 had an ample lumen after operation and subsequent dilatation, and in 22 of these the tracheotomy opening has been closed. Of 10 patients treated by continuous dilatation and incision of the scar, decannulation was carried out in 8, who were free from symptoms at the time of the report. The remaining 2 still require a tracheotomy opening. Two patients treated by repeated incision of a cicatricial diaphragm without continuous dilatation had, at the time of the report, a free airway.

Carcinoma

From the Mayo Clinic[23] a series of 568 patients treated for carcinoma of the larynx from 1934 to 1943, inclusive, was reported. Four hundred and forty-six of these were treated by surgical measures, and 122 were treated by irradiation. Of those patients who underwent operation, 213 were treated by laryngectomy, 184 by thyrotomy, and 49 by suspension laryngoscopy in which surgical diathermy was employed to destroy the growth or in which radon seeds were inserted into the growth. Of the 446 patients who underwent operation, 90.4 per cent were male and 9.6 per cent were female; 80.9 per cent were between the ages of forty-five and sixty-nine years, 12.6 per cent were less than four years

of age and 6.5 per cent were more than sixty-nine years of age. Of patients who were operated on and who could be traced, 73.5 per cent survived five or more years without recurrence of the growth. Of the laryngectomized patients, 60.2 per cent lived five or more years after operation. Of the patients who underwent thyrotomy, 83.6 per cent lived five or more years after operation. Of the patients treated by surgical diathermy or the insertion of radon seeds under suspension laryngoscopy, 91.7 per cent lived five or more years after operation. Of the patients who were treated by irradiation, 6.9 per cent lived five or more years after operation; 46 per cent of these patients underwent preliminary tracheotomy. The lower survival rate associated with laryngectomy is to be expected because all malignant lesions treated by this method were large; some had extralaryngeal extensions at the time of operation and some eventually showed metastases. The high rate of survival of patients treated by diathermy or the implantation of radon seeds under suspension laryngoscopy can be attributed to the facts that these patients were selected carefully and that the lesions were of low grade. The low survival rate of patients treated by irradiation is to be expected, since practically all the patients had inoperable lesions, the majority of which were considered completely hopeless when the patient was first examined.

References

1. Moorhead, R L. Fenestration for otosclerosis: report of 123 cases. *Arch. Otolaryng.* **45**:49-60, 1947.
2. Lindsay, J. R. Fenestration operation; observations on evaluation of hearing tests. *Laryngoscope* **57**:367-380. 1947.
3. MacLaren, W. R., and Chaney, A. L. Evaluation of some factors in development of occupational deafness. *Indust. Med.* **16**:109-115, 1947.
4. Clayton-Jones, E. Rubella as cause of congenital deafness in England. *Lancet* **1**:56-61, 1947.
5. Goodhill, V. Educational treatment of pre-school deaf child. *Laryngoscope* **57**:555-563, 1947.
6. de Raadt, O. L. E. Initial oto-neurologic disturbance in pellagra. *Acta oto-laryng.* **35**:231-250, 1947.
7. Lewis, D. K. Acoustic neuritis associated with keratitis. *Ann. Otol., Rhin. & Laryng.* **56**:194-205, 1947.
8. Von Leden, H., and Horton, B. T. Auditory nerve in multiple sclerosis. *Proc. Staff. Meet., Mayo Clin.* **22**:279-280, 1947.
9. Fowler, E. P., Jr., and Seligman, E. Otic complications of streptomycin therapy: preliminary report. *J. A. M. A.* **133**:87-91, 1947.
10. McNally, W. J. Physiology of vestibular mechanism in relation to vertigo. *Ann. Otol., Rhin. & Laryng.* **56**:514-533, 1947.
11. Lindsay, J. R. Pathology of vertigo arising from peripheral vestibular apparatus. *Ann. Otol., Rhin. & Laryng.* **56**:541-556, 1947.
12. Cawthorne, T. Ménière's disease. *Ann. Otol., Rhin. & Laryng.* **56**: 18-38, 1947.
13. Williams, H. L. Diagnosis and treatment of endolymphatic hydrops (Ménière's disease). *J. Iowa M. Soc.* **37**:1-6, 1947.
14. Furstenberg, A. C. Summation: symposium on vertigo. *Ann. Otol., Rhin. & Laryng.* **56**:576-582, 1947.
15. Koch, H. H. Allergic investigations of chronic otitis. *Acta oto-laryng.* (supp.) **62**:1-201, 1947.
16. Goodyear, H. M. Surgery on frontal sinus. *Laryngoscope* **57**:340-353, 1947.
17. Anderson, F. M. Subdural empyema secondary to frontal sinusitis: review of clinical features and report of three cases. *Ann. Otol., Rhin. & Laryng.* **56**:5-17, 1947.
18. New, G. B. Congenital cysts of tongue, floor of mouth, pharynx and larynx. *Arch. Otolaryng.* **45**:145-158, 1947.
19. Morgan, E. A., and Wishart, D. E. S. Laryngo-tracheobronchitis (statistical review of 549 cases). *Canad. M. A. J.* **56**:8-15, 1947.
20. Davis, H. V. Obstructive laryngitis in children caused by *Haemophilus influenzae* bacillus type B. *J. Kansas M. Soc.* **48**:105-108, 1947.
21. Priest, R. E., Boies, L. R., and Goltz, N. F. Tracheotomy in bulbar poliomyelitis. *Ann. Otol., Rhin. & Laryng.* **56**:250-263, 1947.
22. Figi, F. A. Etiology and treatment of cicatricial stenosis of larynx and trachea. *South. M. J.* **40**:17-26, 1947.
23. New, G. B., Figi, F. A., Havens, F. Z., and Erich, J. B. Carcinoma of larynx: methods and results of treatment. *Surg., Gynec. & Obst.* **85**:623-629, 1947.

NEW HAMPSHIRE MEDICAL SOCIETY

PROCEEDINGS OF THE ONE HUNDRED AND FIFTY-SEVENTH ANNIVERSARY

House of Delegates, June 1, 2 and 3, 1948 (Concluded)

The report of the Committee on Public Health was presented:

The Committee devoted its attention during the past year to the proper public-health coverage for the State.

It is evident through the casual perusal of town reports that the matter of public health receives little or no attention. The smaller towns appropriate five or ten dollars a year as salary for their public-health officials, and expect them to make all sanitary inspections, to correct unsanitary conditions satisfactorily and to post cases of communicable disease. Often, they select as health officer one who has no training whatsoever, and because of the low salary or pay offered, he performs his duties reluctantly, unsatisfactorily and haphazardly. In some towns the physician serves as the community health officer, but has only the time to list the communicable diseases required by law. Even in the larger towns and cities, the health departments, if they can be called such, are undermanned, and an adequate public-health program is not possible.

In some cities more money is expended for the care of cemeteries and for parks and trees than for the health departments. One city, for example, expended $7000 for the health of its people, $17,000 for parks and shade trees, and $39,000 for the care of the dead.

The counties have no health setup whatsoever, and the maintenance of public-health standards for the State resolves in most part upon the State health department. It is generally conceded that with the staff available, the State health department does an excellent job. It is also generally conceded that only the surface can be scratched so far as the entire State is concerned. A much more extensive health organization is needed adequately to protect the health of the people, as well as to educate them in public-health matters. The small beginning made by the Dental Division of the State Department of Health is to be commended.

There are two solutions to the problem at hand. The first is to improve the qualifications of the local health officials, but this seems an impossible task inasmuch as the pay involved is insufficient. The second solution, and by far the more feasible one, is the establishment by the State Department of Health, through proper legislation and adequate appropriations, of regional headquarters by county lines or by geographic areas, so that all the State may be adequately covered.

The opposition to this organization is twofold. The first is the reduction of authority of the towns, and the second the increase of the burden of the taxpayers. It seems that the same situation is present in this case as in that of the State Police, whose duty it is to safeguard the people of the State, in conjunction with local authorities.

The additional expense of this expansion would in part be borne by the federal Government, which would partially offset the budget increases. One such subdivision has been operated in the Exeter area for the past six years, and the results have been gratifying.

This state-wide organization meets the approval of health authorities, and it would mean no radical change in the setup of the State Department of Health.

The immediate expansion of the regional headquarters does not require expensive personnel, and in some areas not even a medical director would be necessary. Properly trained sanitary inspectors, and possibly a sanitary engineer, could adequately run the work for the present.

State nurses, who are now located in various sections, would therefore have local headquarters in place of makeshift ones, which are now used in some areas. These headquarters would serve as local distribution centers for serums, laboratory supplies, public-health literature and other health information. They not only would expedite the work of the Health Department but also would definitely decrease health hazards, and improve the general health of the communities. An active educational program could be adequately promulgated through societies, schools and special courses.

It is the belief of the Committee that active steps should be taken by the New Hampshire Medical Society to foster this program in the next legislative session. It will be necessary to show clearly and concisely to the various members of the legislature that such a need is evident, and that the increased appropriations for its development will be money well invested with handsome returns in the form of better health to all the people of the State. It is suggested that the Committee on Public Health be given instructions, that the health expansion program may become actual in due time.

DONALD G. BARTON, *Chairman*
HARRY W. SAVAGE
HERMANN N. SANDER

Dr. Sycamore, for the Committee on Officers' Reports, moved that the Society go on record as deploring the inadequacy of public-health measures throughout the state, and that the Committee on Public Health be authorized to appear before the Legislature to present the needs in this field.

This motion was duly seconded and was carried.

Dr. Deering G. Smith, delegate to the American Medical Association, presented the following report:

The first interim session of the American Medical Association was held in Cleveland in January. This included the meeting of the House of Delegates, and a scientific program for general practitioners, which was attended by over 3000 enthusiastic physicians.

Your delegate served as chairman of the Reference Committee on Reports of Officers, and later was appointed a member of an interim committee to study the question of intern placements. Many more internships are available than there are physicians desiring them, which makes their distribution a serious problem to many hospitals. Others matters being studied by special committees are the nursing situation and the practice of medicine by hospitals.

The importance of the general practitioner was stressed in the "Grass Roots Conference," where his problems were discussed, and by the presentation of the General Practitioner's Award, for rendering exceptional service to his community, to Dr. Archer C. Sudan, of Colorado.

The question of what the American Medical Association is doing to improve medical care and to combat state medicine is often heard. The answer is given in an excellent report of the Board of Trustees, showing the progress that has been made toward the accomplishment of the objectives of the "Ten Point National Health Program of the American Medical Association." This report is printed on pages 261-266 of the *Journal of the American Medical Association* of January 24, 1948, and is worthy of attention.

The Council on National Emergency Medical Service has become active, and it is hoped that with the co-operation of the federal authorities and the various state committees like our own, definite plans may be made for handling emergencies.

A report was given concerning the formation of the world medical association. Forty-eight nations are represented in the association, which is indirectly a medium

for better understanding and the promotion of world peace.

The House of Delegates also received reports on and discussed the correlation and extension of voluntary prepayment medical care plans, streamlining the procedure of the House, revision of the constitution and by-laws, increasing the Fellowship dues and subscription to the *Journal* to $12.00 annually, creation of several new sections in the scientific body, approval of the Red Cross blood program, improvement of rural medical service and other matters relating to medical care.

The annual session of the Association will be held in Chicago later this month. Your delegate expects to be present, and will be pleased to bring before the House anything that the House of Delegates may wish presented there.

Dr. Sycamore moved that the report of the Delegate to the American Medical Association be accepted.

This motion was duly seconded and was carried.

The report of the Committee on Medical Education and Hospitals was then presented, as follows:

The Speakers' Bureau has been somewhat rejuvenated since the resumption of more normal programs after the war. The membership of the Society was circularized last fall, and twenty-seven men indicated their willingness to be so listed. These lists are being classified by fields and sent to county-society secretaries.

The American Medical Association is now entering this activity with particular emphasis on speakers for lay audiences, and state and national lists will be combined for this purpose. The American Medical Association will keep the Chairman of the Committee informed whenever some prominent figure of the national association might be in this section, so that his services can be made available if desired. In this connection it might be advisable for county-society secretaries to inform the Chairman of the Committee whenever special speakers for lay audiences are sought.

The Hill–Burton Act, providing federal aid for hospital construction, is to operate in connection with the hospital plan of each state as approved by the United States Public Health Service. The New Hampshire plan has now been approved and will soon start operation, the first year of which will have terminated on June 30, 1949. This situation was rather thoroughly covered in the last annual report of the Committee.

The one urgent matter at this time is the enlisting of the active support of the officers of the Society in stimulating the interest of our membership in the New England Postgraduate Medical Assembly. A tremendous amount of work has been done by the Massachusetts membership of its Executive Committee, and the financial risk — a real one in the early days — was entirely assumed by the Massachusetts Medical Society.

The New Hampshire Medical Society, like several other state societies in this region, is not of sufficient membership or financial resources to conduct a state postgraduate assembly of its own. The New England Postgraduate Assembly is a logical solution. It has been a progressively successful venture — last year a splendid program was presented most efficiently — with excellent speakers and a wide range of subjects over the field of the general practice of medicine. Of the 591 members of the New Hampshire Medical Society, less than 30 registered at the Assembly last year. This is a rather pitiful participation from the standpoint of evidence of interest, when it is recollected that 65 per cent of our members are within two hours of Boston. This Committee doubts the extent of its function in stimulating a more real interest in New Hampshire registrations at the Assembly, but suggests that the senior officers of the Society bring the matter before one of the general sessions at the annual meeting.

JOHN P. BOWLER, *Chairman*
JAMES W. JAMESON
SAMUEL M. BROOKS

Dr. Sycamore moved that the Committee on Scientific Work be instructed to recommend procedures for stimulating the interest of the members of the New Hampshire Medical Society in the New England Postgraduate Assembly, and that the Secretary be instructed to carry out such recommendations as may be feasible.

This motion was duly seconded and was carried.

Dr. Dye then stated that Dr. Parker had requested that the Committee on Industrial Health be made twelve members instead of three. It was necessary that the recommendation be brought before the meeting, to amend the by-laws, and that this matter be laid on the table for one day.

This motion was duly seconded and was carried.

Dr. Dye then moved that the meeting be adjourned until the following morning at nine o'clock.

This motion was duly seconded and was carried.

Whereupon, the first meeting of the House of Delegates was adjourned at 10:45 p.m.

The House of Delegates reconvened at Wentworth-by-the-Sea, Newcastle, on June 2, 1948, at 9:00 a.m., with Speaker McIvor presiding.

The President, *ex-officio*
The Vice-President, *ex-officio*
The Secretary-Treasurer, *ex-officio*
Nathan Brody, Laconia
Reginald F. DeWitt, Plymouth
W. J. Paul Dye, Wolfeboro
Francis J. C. Dube, Center Ossipee
Walter H. Lacey, Keene
Marjorie A. Parsons, Colebrook
Francis M. Appleton, Gorham
Leslie K. Sycamore, Hanover
Leslie E. McKinlay, North Haverhill
Everett C. Campbell, Woodsville
Reginald K. House, Hanover
Joseph N. Friborg, Manchester
Norman W. Crisp, Nashua
Claire G. Cayward, New Ipswich
Daniel J. Sullivan, Nashua
Andrew L. MacMillan, Concord
Francis Brown, Henniker
L. Whitaker, Portsmouth (alternate for John W. Blaisdell)
Donald W. Leonard, Exeter
Fred Fernald, Nottingham
A. E. Barcomb (alternate for Daniel F. McCooey)
Edna Walck, Dover
B. Read Lewin, Claremont

The speaker declared a quorum present and asked whether the members had any names to present for life memberships.

Dr. MacMillan, for Merrimack County, presented the name of W. H. Mitchell.

Dr. Walck, for Strafford County, presented the names of Anna C. Rudd, of Durham, and E. M. Abbott, of Rochester.

The Secretary, when it had been explained that Dr. Abbott had not been a member for a continuous fifteen years, stated that the by-laws would have to be amended to authorize life membership for him.

Dr. Parsons suggested that, since Dr. Abbott was disabled, the by-laws be changed so that anyone who is totally disabled would be eligible.

Dr. Dye observed that such a change could be laid on the table and voted on the following day.

Dr. Brody moved that the word "continuous" be removed from the by-laws.

Dr. Friborg seconded the motion.

The Speaker then requested all those in favor of amending Section 5 of the by-laws to read: "Any physician who has been a member of this Society for fifteen years is eligible for life membership" to signify assent by raising the right hand.

There were seventeen hands raised for the motion, and fourteen against the motion, which was declared to be carried.

Dr. Parsons, for Coos County, presented the names of John M. Blodgett, R. E. Webb, Edward R. B. McGee, L. B. Marcou and A. C. Rondinella.

Dr. Dye moved that all the names be accepted for life membership, except Dr. Abbott, who would be voted upon on the following day.

This motion was duly seconded and was carried.

The Report of the Committee on Industrial Health was then presented, as follows:

The Committee has not accomplished all it desired during the past year, but it is believed that the groundwork has been laid for greater effort in industrial medicine during the coming years.

It is desired to point out at the beginning of this report that, among a large number of industrial officials in New Hampshire, and to a certain extent among the physicians, an apathy exists to industrial medical service. The importance of the problem of preventive medicine in industry received tremendous stimulus during the war, and today in practically every state, more and more emphasis and effort is being directed to meet these problems. Medical societies, nurses' groups, industrial organizations, Government health organizations, insurance companies and others are working together in an effort to reduce to a minimum, sickness and injuries that cause absenteeism from work and great economic losses to both the employer and the employees. It is a well known fact that the provision of good preventive medical programs, with adequate medical care of injuries and potential illnesses, will keep industrial absenteeism at a minimum.

New Hampshire is an industrial state and ranks fourth of all states in the percentage of workers gainfully employed in industrial plants. In 1938 the State Health Department conducted a survey of all plants for the purpose of determining health conditions in the plants, and the medical and nursing services provided for the employees.

The results of this survey showed that the health-service provisions available for workers were much lower than in other states and areas. Although this condition has improved to some extent during recent years, particularly in the number of nurses employed by plants, there is still a great need for improvement.

Early in the year a meeting of the Committee was held with the director of the Division of Industrial Hygiene, New Hampshire State Department of Health in Concord, at which objectives were drawn up that would enhance close co-operation of the New Hampshire Medical Society and the State Department of Health in the conduct of an industrial health program. The following objectives were unanimously approved at this meeting:

The Committee on Industrial Health, New Hampshire Medical Society, and the Division of Industrial Hygiene, New Hampshire State Department of Health, will work in close co-operation with each other. Policies, procedures and methods of the program will be discussed jointly by both organizations.

The Committee on Industrial Health approves the present health activities of the Division of Industrial Hygiene. These activities include engineering and chemical studies for the purpose of evaluating potential health hazards from dusts, gases, fumes, mists, vapors and other substances to which workers are exposed at the various operations in industrial plants; investigations of reported occupational diseases for the purpose of assisting industry in the prevention of additional cases; the conduct of health evaluation surveys in small industrial plants; the study of the silicosis problem in view of prevention; and the promotion of health education among industrial workers.

The Committee voted to have the Chairman invite the New Hampshire Manufacturers Association to appoint a committee on industrial health, which would work in conjunction with our committee. This invitation was forwarded to the president of the New Hampshire Manufacturers Association, and a reply was received that such a committee would be appointed. After much delay notification was received on April 29, 1948, that a committee had been appointed. Members of this committee are: Charles S. Parsons, of the Chicopee Manufacturing Company, Manchester; Eustace Cummings, of E. Cummings Leather Company, Incorporated, Lebanon; and C. Henry O'Neil, of the Nashua Gummed and Coated Paper Company, Nashua.

At this meeting, the following resolutions were adopted by the Committee and are submitted to the Society for its consideration and approval:

That the New Hampshire Medical Society urge all members to report known occupational diseases to the New Hampshire State Department of Health as provided under Chapter 132, Section 1-5, of the New Hampshire State Public Law. The reporting of these diseases is particularly important in view of the Workmen's Compensation Law as passed by the last legislature for the compensation of occupational diseases. It is understood by the Committee that no compensation will be paid for occupational diseases until official reports have been made by the attending physician.

That the Society include in its future scientific programs a symposium on industrial health, or invite a nationally known speaker to present a subject of interest to the general practitioners on industrial health. In view of the large variety of new chemicals and other substances being used in the industrial plants in New Hampshire, it is believed that the medical profession should be familiar with the toxicity and action of such materials to recognize early symptoms of absorption among industrial employees. The State Health Department has available a 70-mm. mobile x-ray unit, and through the co-operation of the physicians and industrial officials, screening x-ray films can be made available to the industrial workers.

That the Society urge industry to make provisions for employing handicapped persons, provided that they are not hazardous to themselves and fellow employees, and are able to perform assigned duties satisfactorily.

That members of the Society co-operate with the Division of Industrial Hygiene, New Hampshire State Department of Health, in the conduct of health evaluation surveys among industrial employees.

These surveys consist essentially of an evaluation of the health of the employees in various types of industry in the State. The surveys include chest x-ray films, dental examinations, eye tests, hearing tests, examination of the urine for albumin and sugar and special tests if the employees are exposed to toxic materials. The results of these tests are entirely confidential between the individual employee, the employee's physician and the New Hampshire State Department of Health. If defects are found, the employee is requested to see his own physician for further study.

The Committee recommends that industrial plants employing 500 or more persons employ a full-time nurse with adequate industrial training, who will work under the supervision of a physician. Smaller plants should combine to employ a nurse who will divide her services between the individual plants. The physician and nurse should spend regular hours at the plant. In addition, the plants should provide medical dispensaries with adequate facilities and equipment.

For the activities and achievements of the committee to be increased, it is requested that the membership of the committee be increased to twelve members, to include physicians who are actively engaged in industrial medicine and who reside in the industrial cities of this State.

It is planned for the coming year that the Committee will prepare and distribute informative literature relative to industrial health problems. This material will be prepared in co-operation with the Division of Industrial Hygiene, State Health Department, and the Committee on Industrial Health, New Hampshire Manufacturers' Association.

DAVID W. PARKER, *Chairman*

Dr. Sycamore moved that the recommendations of the Committee on Industrial Health be approved.

This motion was duly seconded and was carried.

Dr. Dye stated that on the previous night it had been voted to amend the by-laws to change the membership of the Committee on Industrial Health from three to twelve members. It was laid on the table until this morning. He therefore, moved that the by-laws be changed to read "twelve members."

This motion was duly seconded and was carried.

President Hunter then stated that he had had a letter from Dr. Howard B. Sprague, of Boston, asking if the New Hampshire Medical Society would contribute money for the New England Branch of the American Heart Association. He had replied that of course, nothing could be done, until this meeting of the House of Delegates.

The Speaker asked for discussion on this matter.

Dr. Dye replied that he considered the project worth while but doubted whether the Society could afford to establish a precedent of giving contributions to different worthy causes. Therefore, he moved that the Secretary write to Dr. Sprague and say that the Society is heartily in sympathy with the American Heart Association cause and will do anything that it can in the way of individual contributions to help out but that as a State Society it had a precedent of not making contributions.

This motion was duly seconded and was carried.

The Secretary suggested that the President answer the letter of Dr. Sprague.

Dr. Brown then observed that Merrimack County Society had voted at its last meeting to assume the responsibility for a hospital bill of a former member of the Society who was in financial straits; he asked whether there was any fund to take care of anything like this, such as reimbursing the county society.

Dr. MacMillan stated that Merrimack County was not agreed regarding this matter; he had been asked to present the same question, and his opinion was that such a step was ill advised.

The Speaker remarked that he agreed with Dr. MacMillan.

The second meeting of the House of Delegates adjourned at 9:45 a.m.

The House of Delegates reconvened at Wentworth-by-the-Sea, Newcastle, on June 3, 1948, at 9:15 a.m., with Vice-Speaker Dube presiding.

The following members answered the roll call:

The President, *ex-officio*
The Vice-President, *ex-officio*
The Secretary-Treasurer, *ex-officio*
Nathan Brody, Laconia
W. J. Paul Dye, Wolfeboro
Francis J. C. Dube, Center Ossipee
Walter H. Lacey, Keene (alternate)
Marjorie A. Parsons, Colebrook
Francis M. Appleton, Gorham
Leslie K. Sycamore, Hanover
Reginald K. House, Hanover
Joseph N. Friborg, Manchester
Andrew L. MacMillan, Concord
Francis Brown, Henniker
Fred Fernald, Nottingham
A. E. Barcomb (alternate)
B. Read Lewin, Claremont

The Speaker declared a quorum present.

President Hunter nominated Dr. George C. Wilkins and Dr. George Dwinell in place of the delegates from Hillsborough County not present.

The Committee on Nominations presented its report, and the balloting took place for the office of president and vice-president, as follows:

PRESIDENT
Clarence E. Dunbar, M.D., of Manchester

VICE-PRESIDENT
John P. Bowler, M.D., of Hanover

COUNCILOR FOR BELKNAP COUNTY FOR FIVE YEARS
Chester L. Smart, M.D., of Laconia

COUNCILOR FOR GRAFTON COUNTY FOR FIVE YEARS
Arthur W. Burnham, M.D., of Lebanon

TRUSTEE FOR TWO YEARS
James W. Jameson, M.D., of Concord

TRUSTEE FOR THREE YEARS
George C. Wilkins, M.D., of Manchester

SPEAKER OF THE HOUSE OF DELEGATES
Francis J. C. Dube, M.D., of Center Ossipee

VICE-SPEAKER OF THE HOUSE OF DELEGATES
B. Read Lewin, M.D., of Claremont

NECROLOGIST
Ralph W. Tuttle, M.D., of Wolfeboro

DELEGATE TO THE AMERICAN MEDICAL ASSOCIATION FOR 1948–50
Deering G. Smith, M.D., of Nashua

ALTERNATE DELEGATE TO THE AMERICAN MEDICAL ASSOCIATION FOR 1948–50
Howard P. Sawyer, M.D., of Brookfield

STANDING COMMITTEES

Advisory Committee on Jurisprudence: Chester L. Smart, Belknap County; W. J. Paul Dye, Carroll County; Robert W. Holmes, Cheshire County; Arthur W. Burnham, Grafton County; David W. Parker, Hillsborough County; Robert J. Graves, Merrimack County; Lawrence R. Hazzard, Rockingham County; Jeremiah J. Morin, Strafford County; B. Read Lewin, Sullivan County; Carleton R. Metcalf, Concord, *Chairman*.

Amendments to Constitution and By-Laws: W. J. Paul Dye, Wolfeboro; Loren F. Richards, Nashua; Joseph E. Larochelle, Berlin.

Child Health: Thomas B. Walker, Portsmouth; Ursula G. Sanders, Concord; Marion Fairfield, Nashua.

Control of Cancer: George C. Wilkins, Manchester; Ralph E. Miller, Hanover; George F. Dwinell, Manchester; Walter H. Lacey, Keene; Albert Oppenheimer, Laconia.

Council of New England Medical Societies: Carleton R. Metcalf, Concord; Clarence E. Dunbar, Manchester; Ralph W. Tuttle, Wolfeboro.

Industrial Health: David W. Parker, Manchester; Henry Almond, Berlin; Robert J. Graves, Concord; Charles F. Keeley, Claremont; Robert W. Holmes, Keene; John Samuel Wheeler, Concord; Daniel F. McCooey, Dover; John C. Eckels, Laconia; Robert Flanders, Manchester; John H. Kennard, Manchester; Timothy Francis Rock, Nashua; Charles I. Umpa, Nashua.

Maternity and Infancy: Robert O. Blood, Concord; Benjamin P. Burpee, Manchester; Frederick S. Gray, Portsmouth.

Medical Economics: Leslie K. Sycamore, Hanover; Francis J. C. Dube, Center Ossipee; Joseph N. Friborg, Manchester.

Medical Education and Hospitals: John P. Bowler, Hanover; James W. Jameson, Concord; Howard P. Sawyer, Brookfield.

Mental Hygiene: Arthur B. Howard, Concord; Edward S. Morris, Laconia; Simon Stone, Manchester.

National Emergency Medical Service: Daniel J. Sullivan, Nashua; Joseph M. McCarthy, Concord; Clarence E. Dunbar, Manchester; Bernard J. Manning, Dover; John C. Eckels, Laconia.

Public Health: Donald G. Barton, Concord; Harry W. Savage, Lebanon; Hermann N. Sander, Manchester.

Public Relations: Clarence E. Dunbar, Manchester (president); John P. Bowler, Hanover (vice-president); Carleton R. Metcalf, Concord, (Secretary-Treasurer); Francis Brown, Henniker; Joseph N. Friborg, Manchester.

Publications: Carleton R. Metcalf, Concord; Samuel J. King, Rochester; Lester R. Whitaker, Portsmouth.

Rural Health: William F. Putnam, Lyme; William P. Clough, Jr., New London; Samuel Feiner, Ashland.

Scientific Work: Carleton R. Metcalf, Concord; Robert R. Rix, Manchester; Sven Gundersen, Hanover.

Tuberculosis: Robert B. Kerr, Manchester; Frank G. Seldon, Manchester; John D. Spring, Nashua.

Dr. Dye then moved that the amendment to Section 5 of the by-laws, voted upon at the meeting of the previous day, be approved and that the Article concerning life membership be changed, striking out the word "continuous" on page 19, Section 5, Chapter I, so that the section would read:

> Any physician who has been a member of this Society for a term of fifteen years and is either not less than sixty-five years of age or totally disabled, on the request of his county society, may be made a life member by a majority of the votes of the House of Delegates. Life members shall have the same rights and privileges as other members of the Society, but shall not be required to pay dues.

This motion was duly seconded and was carried by the majority required.

Dr. Sycamore then stated that the New Hampshire members of the Board of Physicians Service were subject to the approval of the House of Delegates, and he moved that these members be approved.

This motion was duly seconded and was carried.

The financial report of the Trustees was then presented, as follows:

JANUARY 1–DECEMBER 31, 1947

GENERAL FUND

Receipts:		
Balance on hand Jan. 1	$2,633.68	
Nashua Trust, Interest	10.72	
Portsmouth Trust and Guarantee, Interest	23.45	
New Hampshire Savings, Interest	15.50	
United States Series G Bonds, Interest	81.25	
Total receipts	$2,764.60	
Cash balance Dec. 31		$2,764.60
United States Series G Bonds		5,000.00
Total fund		$7,764.60

BARTLETT FUND

Receipts:		
Balance on hand Jan. 1	$2,190.94	
Portsmouth Savings, Interest	43.81	
United States Series G Bonds, Interest	25.00	
Cash balance Dec. 31		$2,259.75
United States Series G Bonds		2,000.00
Total fund		$4,259.75

PRAY FUND

Receipts:		
Balance on hand Jan. 1	$350.19	
Strafford Savings, Interest	6.64	
United States Series G Bond, Interest	12.50	
Total receipts	$369.33	
Expenditures:		
Essay prize	50.00	
Cash balance Dec. 31		319.33
United States Series G Bonds		1,000.00
Total fund		$1,319.33

BURNHAM FUND

Receipts:		
Balance on hand Jan. 1	$1,157.11	
New Hampshire Savings, Interest	22.20	
United States Series G Bond, Interest	12.50	
Total receipts	$1,191.81	
Expenditures:		
Essay prize	100.00	
Cash balance Dec. 31		$1,091.81
United States Series G Bonds		1,000.00
Total fund		$2,091.81

BENEVOLENCE FUND

Receipts:		
Balance on hand Jan. 1	$3,643.59	
New Hampshire Savings, Interest	74.51	
United States Series G Bonds, Interest	37.50	
Dr. C. R. Metcalf	140.00	
Total receipts		$3,895.60
United States Series G Bonds		3,000.00
Total fund		$6,895.60

Signed,

HOWARD N. KINGSFORD
GEO. C. WILKINS

Audited and found correct, May 14, 1948

(Signed) DAVID C. RENNIE, *Auditor*

Dr. Sycamore then observed that the matter of the telegram from the California Medical Association regarding Governor Warren had been referred to the Committee on Officers' Reports, which recommended the following resolution:

Whereas, Governor Earl Warren of California has announced his candidacy for the Republican nomination for President of the United States; and

Whereas, Governor Warren has advocated a state system of compulsory sickness insurance in California and is alleged to advocate the inclusion in the Republican platform of a plank favoring national compulsory sickness insurance; and

Whereas, the New Hampshire Medical Society is opposed to any form of national compulsory sickness insurance;

Therefore, be it resolved: That the New Hampshire Medical Society is opposed to the nomination of Governor Warren for either the Presidency or Vice-Presidency of the United States;

And be it further resolved: That the New Hampshire Medical Society is opposed to the inclusion in the Republican Platform of any plank favoring national compulsory sickness insurance;

And be it further resolved: That a copy of this resolution be sent to the New Hampshire representatives in Congress and to the members of the New Hampshire delegation to the Republican National Convention.

Dr. Sycamore moved the adoption of this resolution.

This motion was duly seconded and was carried.

The Secretary then spoke as follows:

I am a little discouraged about our New Hampshire Society, which looks as if it were dying from old age. We have 160 people out for this meeting; we had 222 last year, and ten years ago we used to draw 300. Whether it is the location of the meeting, the cost of the meeting or the program, I do not know, but the men do not come. It seems to me that we have got to put our finger on the sore spot, if we can, and see why our meetings do not attract more people.

This morning before the meeting, it was mentioned that we could have a meeting at Hanover, so that there could be some clinical cases to see. Dr. Sycamore thought they could handle the crowd all right, there, after the middle of June. And, of course, we also spoke about going up into the mountains another year. I do not know whether we can settle on it this morning; if it cannot be settled here, it ought to be delegated to the officers or to somebody who could go over the situation. But, for one, I should certainly like to get any ideas on the subject that will buck the thing up.

Another suggestion that was made was to have a one-day meeting, similar to the meeting of the New Hampshire Surgical Club, and not try to stay overnight anywhere, and have it at some place like Manchester or Concord, and perhaps put on a clinical show in addition to the papers.

If any of you have any ideas on what is wrong with the New Hampshire Medical Society, I should like to hear them.

Dr. George C. Wilkins stated that if the meetings were held in Manchester or Concord, there would be a larger attendance, but, unfortunately, there were insufficient accommodations in both cities, which was one of the reasons why Newcastle had been selected.

He believed that the meetings, when held at a summer hotel, kept away a certain number of people, on account of the expense involved. Another thing was the distance required to travel for a certain number of people who live in the upper part of the State.

The Secretary observed that for several years, the afternoon programs had been made up of speakers from outside New Hampshire. However, this year, a good many New Hampshire men had been on for brief papers in the afternoon. This matter of the type of program preferred should be settled.

Dr. Brody remarked that the largest concentration of medical men was apparently in Nashua, Manchester and Concord — probably close to 150 men — and that if the meetings could be held near those cities, the attendance might be better. He suggested a one-day meeting in one of those cities.

The Secretary replied that the meeting would then be similar to those of the New Hampshire Surgical Club meetings.

Dr. Brown asked what the attendance was at those meetings.

The Secretary answered that during the war a great many of the men were away, and the meetings were rather poorly attended.

Dr. Brown then asked what percentage of the people attending the meeting attended the scientific sessions.

The Secretary stated that 116 doctors had been registered on the previous day; he did not know how many were present at the afternoon session. He guessed that about half the members went to the scientific sessions.

Dr. Dunbar stated that if the meetings were held near the center of the population, the problem of finding accommodations would come up. He suggested that arrangements be made at some of the overnight camps.

Dr. MacMillan did not think that it would be wise to go back to the one-day meeting, which he considered to be the poorest meetings the Society had ever had. He suggested that the lack of attendance be overlooked and the meetings made as good as possible, so as to interest more members.

The Secretary asked whether the House of Delegates favored having New Hampshire men on the afternoon program or trying to get men from the urban centers outside the State.

Dr. House believed that it was more stimulating to have men from outside the State. If somebody came in from outside, he might give the members a little something else to think about.

The Secretary replied that last year, the obstetrician-in-chief at Johns Hopkins University School of Medicine had spoken to an audience of twenty-three.

The Speaker asked how many members were in favor of continuing the two-day sessions.

Almost all hands were raised.

He then asked how many were in favor of returning to Newcastle next year, late in June, when it would be warmer.

Nine delegates raised their hands.

In reply to the question how many were in favor of going somewhere else, several delegates raised hands, and to the question how many would be in favor of having during the afternoon sessions out-of-state speakers of international or national fame there was no response.

Unanimous approval was expressed of the idea of having a program at the afternoon sessions with New Hampshire men, such as those at the present session, as well as out-of-state men.

A member asked what the opinion was about using the first evening for papers, and leaving the afternoon free for enjoying golf or whatever the members wished to do.

Fifteen delegates raised hands.

The Speaker asked how many were in favor of having formal dress at the banquet.

No hands were raised.

The Secretary stated that the idea of using the first evening for scientific sessions was original but that some members might complain unless there was something for them to do in the afternoon.

After further discussion Dr. Sycamore moved that the time and place of the next meeting be left to the officers of the Society, taking into consideration the foregoing discussion.

This motion was duly seconded and was carried.

Dr. Dye then moved that Dr. Abbott, of Rochester, be made a life member.

This motion was duly seconded and was carried.

Dr. Friborg moved that the Rockingham County Committee be thanked for the work in preparing the program.

This motion was duly seconded and was carried.

Speaker Dube then declared the meeting adjourned.

Whereupon, the third meeting of the House of Delegates was adjourned at 10:15 a.m.

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

BENJAMIN CASTLEMAN, M.D., *Associate Editor*

EDITH E. PARRIS, *Assistant Editor*

CASE 34481

PRESENTATION OF CASE

A forty-one-year-old woman was admitted to the hospital from a chest clinic because of a lesion in the left chest.

The patient was well until three months before admission, when she contracted an upper respiratory infection with coryza, hoarseness and a cough productive of half a cup of brownish-gray sputum a day. The cough and sputum production subsided, but hoarseness continued, and increasing dyspnea, rapid breathing, occasional "choking" spells and wheezing respiration followed. There had been a 15-pound weight loss in four months, despite an excellent appetite, and progressive weakness. The latter was intermittent, accompanied by profuse sweating and a feeling of imminent blackout. For three weeks she had soreness in the left chest. When she was eighteen, she had a spot on the right lung, which cleared after a year of bed rest. Eleven years before admission a right nephrostomy for renal calculi was performed. Three years before entry a total hysterectomy and right salpingo-oophorectomy were performed at this hospital for vaginal bleeding. The pathological diagnosis was tubal pregnancy. Two years before entry a neighbor, with whom she had had contact, developed tuberculosis. For that reason a chest x-ray film was taken at that time. It was reported to be normal.

Physical examination revealed a woman who appeared chronically ill. The fingernails showed moderate clubbing. There were tenderness on pressure over the left chest, anteriorly and posteriorly, and dullness over the left base posteriorly, with decreased left diaphragmatic excursion.

The blood pressure was 140 systolic, 90 diastolic.

Examination of the blood demonstrated a hemoglobin of 12.5 gm. and a white-cell count of 8400. The urine specific gravity was 1.020; no albumin or significant formed elements were found. The nonprotein nitrogen was 16 mg., and the total protein 7.5 gm. per 100 cc.

X-ray examination of the chest demonstrated a well circumscribed area of increased density at the apex of the left lower lobe, measuring about 8 by 8 by 10 cm. (Fig. 1). There was no degeneration within it. The remainder of the lung parenchyma was clear. Intravenous and retrograde pyelography showed a deformity of the calyxes and pelvis on the right, with dilatation of the superior and inferior calyxes. The left kidney pelvis was normal. Both kidney shadows were of normal size.

A bronchoscopy demonstrated no abnormalities. A smear taken from the dorsal division of the left-upper-lobe bronchus was negative for tumor cells. In smears taken from the left-lower-lobe bronchus a few acid-fast bacilli were found. Needle aspiration of the chest lesion was unsuccessful. During the first

ten hospital days the patient's course was not remarkable. She was afebrile. On the eleventh hospital day an operation was performed.

Differential Diagnosis

Dr. Merrill Sosman:* I think it is fair, inasmuch as the patient was admitted because of an x-ray finding from a chest clinic, to start with the films and then work back to the history, physical examination and laboratory findings.

We can see in this film that this is the chest of a young woman, "young" being comparative — anyone below one's own age is young and anyone above it is old. She has a single lesion in the left midchest, measuring 8 cm. in diameter and not very sharply outlined. In the lateral view, lying well back posteriorly in the chest, the shadow is shaped a good deal like a gumdrop, the flat part being against the posterior chest wall and the anterior surface being sharply rounded or convex. The other findings in the chest appear perfectly normal. The heart is not displaced; the diaphragm is in normal position; the ribs are intact. The trachea appears normal, and all the visible bones appear normal.

Our problem then is to try to find out the nature of this circular mass in the left chest posteriorly, which is in the approximate region of the apex of the lower lobe. Going back to the history we find a great many "red herrings" dragged across the trail. The history says that she had a negative x-ray examination two years before admission following exposure to a patient with tuberculosis. If that is reliable, it certainly would rule out both the congenital group of tumors and the benign tumors. If it was a tumor, it would have had to be malignant to reach this size in two years. Do we know where the x-ray examination was done?

Dr. Tracy B. Mallory: It was done in one of the state sanatoriums.

Dr. Sosman: Then it should be reliable. One other thing that we should note in evaluating the shadow is whether or not it was movable with the lung. Do you know whether the patient was fluoroscoped?

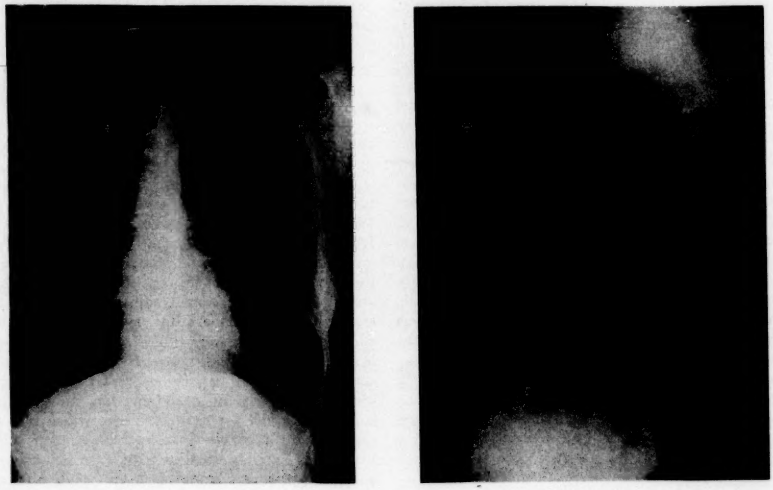

Figure 1.

Dr. Joseph Hanelin: No. I am not familiar with the case.

Dr. Sosman: It might make a difference if it were attached to the chest wall or free in the lung and moved up with cough or expiration. The one thing brought up more than anything else in the history is the story of tuberculosis. She is said to have had "a spot on the right lung" at the age of eighteen. There is no evidence of that at present. She had contact with a patient who was known to have tuberculosis, and this was the cause of her x-ray examination two years previously. Most important of all is the finding of acid-fast bacilli in smears taken from the left-lower-lobe bronchus. If that is reliable, which it certainly should be, we are forced to make a diagnosis of tuberculosis some-

*Radiologist, Peter Bent Brigham Hospital.

where in the respiratory tract and presumably in the left lower lobe because that is where the smears were obtained. Were there any sputum examinations made? I did not notice anything about that in the report.

DR. LAMAR SOUTTER: The sputum was negative for acid-fast organisms.

DR. SOSMAN: So this is an isolated finding on bronchoscopic examination. We must make a diagnosis of pulmonary tuberculosis — postulating the ulcerating tracheobronchial type of tuberculosis — and then try to decide whether this shadow that we see can also be explained on the basis of pulmonary tuberculosis. It is a very rare type of shadow to be produced by tuberculosis in my experience. It is peripheral, which tuberculosis usually is, but it is round and smooth and homogeneous in density, and there is no evidence of cavity or any calcification in it. One of the most important things against it, I think, is the statement that she was afebrile. So we have to consider strongly the possibility that this was a separate lesion and not due to the presumed tuberculosis. Another suggestion in the history is the operation on the kidney some years before admission, and we have here a series of renal studies, both intravenous and retrograde pyelograms, all of which show a definite deformity of the right renal pelvis, which I think can readily be seen. It is quite possible, in fact quite probable, that this deformity is merely the result of previous operation and not of any intrinsic disease in the kidney at present. We notice that there is dilatation of the superior and inferior calyxes, with a rather contracted central portion of the pelvis. The opposite renal pelvis on the left fills well except on one small film, where there is a suggestion of a negative shadow in the renal pelvis. It does not persist so I think we can disregard that.

The hysterectomy and salpingo-oophorectomy are readily explained by the tubal pregnancy and had nothing to do with the mass in the chest, particularly in this interval of time — three years.

Going back to the physical examination we note clubbing of the fingers. How can we tie that up with the mass that we find described in the history and at physical examination? Clubbing in my experience is most common in congenital heart disease. This patient had no murmurs or signs of heart disease. When patients have clubbing from heart disease they usually have murmurs, cyanosis and polycythemia due to the long-continued shunt of blood. The second most common cause of clubbing is primary tumor of the lung, which is nearly always malignant. I took care of a patient who had marked clubbing with a Pancoast type of tumor. Chronic infection of the lung is a third cause of clubbing of the fingers in my experience, and this, of course, can be a tuberculoma or a tuberculous area at the apex of the lower lobe. But, in my limited experience, clubbing in tuberculosis is usually found only in the far-advanced case with cavitation and secondary infection. I would expect it to be quite rare in a lesion of such short duration as this. A fourth cause of clubbing is polyposis of the intestine, which is very rare indeed. There is no gastrointestinal examination here so we cannot consider that.

That about covers my discussion except to say that I cannot explain the dyspnea, the rapid breathing, the choking spells and wheezing respirations noted earlier in the history. The hoarseness continued, and it is quite possible that it was due to tuberculosis of the larynx. This would tie up both things on one foundation. But I presume that the larynx was inspected at the time of bronchoscopy.

DR. EDWARD B. BENEDICT: That is right.

DR. SOSMAN: And nothing abnormal was seen.

DR. BENEDICT: The bronchoscopy was negative.

DR. SOSMAN: If there was enough tuberculosis to cause hoarseness, there should have been something visible on the vocal cords, either thickening or reddening.

So, to sum up this short and very easy case, I may say we are forced to make a diagnosis of pulmonary tuberculosis because of the positive sputum. I would like to tie up the chest lesion with tuberculosis also and call it tuberculoma. If so, one ought to see a large area of consolidation or perhaps atelectasis due to the tuberculosis of the ulcerating tracheobronchial type. But I suspect that there was a separate primary tumor of the lung in addition. Regarding the type of tumor, it is pure speculation in my experience to try to guess the kind of tumor a given patient has unless it has some of the characteristic findings, which this patient did not have. If we want to play poker, which I think is legal in this type of exercise, we may guess that it was nonmalignant because it was located opposite the seventh rib, and yet the ribs resected were the fifth and sixth, leaving the seventh rib intact, which puzzles me a little bit. If it were a malignant tumor invading the chest wall, I would assume that a good surgeon would excise the whole area including the seventh rib. Is that legal?

DR. MALLORY: It is done. Does anyone want to ask any questions?

DR. SOSMAN: I would gladly accept any suggestions or help.

DR. BENEDICT: I do not believe we know what Dr. Sosman's diagnosis is. Is it a benign tumor of the lung?

DR. SOSMAN: No, I think the development of this tumor in two years is against a benign tumor of the lung. My diagnosis, which is based particularly on the acid-fast bacilli that were found, is pulmonary tuberculosis and probably a tuberculous lesion in the apex of the left lower lobe. I would put carcinoma second because of the rapid growth in two years.

Clinical Diagnosis

Carcinoma of lung (before acid-fast organisms were found).

Dr. Sosman's Diagnosis

Pulmonary tuberculosis (from bronchoscopic washings).
Tuberculoma?
Carcinoma of lung, apex of left lower lobe?

Anatomical Diagnosis

Epidermoid carcinoma of lung, left lower lobe.

Pathological Discussion

Dr. Soutter: I operated on this woman. We made a tentative preoperative diagnosis of bronchiogenic carcinoma. This was before the report of the bronchoscopic smears were received on the ward. The incision was made through the bed of the fifth rib to enable us to get above where the tumor was adherent to the chest wall. The tumor was adherent over the sixth rib. If one looks at the postoperative film, one sees the area of absent rib where the tumor was adherent. The appearance of the tumor suggested malignancy. It protruded from the lung tissue and seemed to invade the chest wall. We did a left lower lobectomy, going extrapleurally, and afterward resected that part of the chest wall to which the tumor had been adherent.

Dr. Sosman: That is rather surprising because the sixth rib is at the upper edge of the shadow. The center of the tumor is opposite the seventh rib posteriorly.

Dr. Soutter: The tumor was adherent to the chest wall at its apex and not at its center.

Dr. Mallory: The lobe that was resected showed a large spherical area of epidermoid carcinoma near the apex. We searched very carefully and were not able to find any trace of tuberculosis. I have no explanation for the acid-fast bacilli. I would hate to suggest the bronchoscope.

Dr. Benedict: Of course it is possible there was tuberculosis in the other lobe that we knew nothing about. I was as surprised as anyone when tubercle bacilli were found. There must have been a mistake somewhere.

Dr. Mallory: We must remember that acid-fast bacilli do not always mean tuberculosis, although in the sputum the chance of anything else is so slight that we feel safe in neglecting any other possibility. But we have no real knowledge that they were tubercle bacilli.

Dr. Allen G. Brailey: Where did the tumor arise?

Dr. Mallory: From one of the secondary bronchi running to the apex of the lower lobe. It was completely occluded and surrounded by tumor, and the bronchus leading still higher up was compressed by the mass. The regional lymph nodes were normal. Tumor cells were found in the parietal pleura after it was resected.

Dr. Benedict: The bronchoscopy was negative as you know, but I would like to point out that in that area bronchoscopy probably would be negative for carcinoma. We would not be able to reach a tumor in the apex of the left lower lobe. In a series of 309 cases of proved carcinoma that were bronchoscoped by me in this hospital, there were positive biopsies in 61 per cent. Gibbon and his associates* in Pennsylvania have had positive cytologic studies from bronchoscopic washings in 89 per cent of 105 cases studied. Our figures are not so good on bronchoscopic washings, nor have we done as many. I would say carcinoma was definitely not ruled out at this examination. We have had a few cases with both tuberculosis and carcinoma.

A Physician: Was a Papanicolaou stain done?

Dr. Mallory: Yes, and it was negative.

*Gibbon, J. H., Jr., Clerf, L. H., Herbut, P. A., and DeTuerk, J. J. Diagnosis and operability of bronchiogenic carcinoma. *J. Thoracic Surg.* 17:419-427, 1948.

CASE 34482

Presentation of Case

A sixty-five-year-old woman was admitted to the hospital because of pain in the right side of the face and ptosis of the right eyelid.

About two years before entry the patient began to notice easy fatigability. Eight months before admission, during a routine checkup, she was found to be anemic. She was given liver injections over the following three months and felt improved. Six months before admission the third right upper molar became sensitive to heat, cold and pressure of mastication. A month later the patient began to have a watery discharge from the right nostril, always in the morning and not during the rest of the day. Three months before entry the nasal discharge, still limited to the right nostril, became bloody. The pain increased in severity and spread to the right temporal region. Except for some dried blood in the right nostril an ear, nose and throat specialist could not find any abnormality. Six weeks before admission roentgenograms of the sinuses were reported to be normal. The pain continued to increase, became almost constant and required codeine for relief. It was characterized by a dull, dead ache spreading up from the right maxilla to the temporal region, behind and into the eye, rarely crossing over a little to the left eye. Occasionally the ache was interrupted by shooting pains in the same regions. About ten days before entry the right upper eyelid began to droop. This was followed by diplopia and, three days later, by complete ptosis.

There had not been any weight loss, and appetite was good. There was no history of earache, dis-

charge from the ear, tinnitus, dizziness, nor of unsteadiness, awkwardness or weakness of the arms or legs. Five days before admission a spinal puncture showed an initial pressure equivalent to 65 mm. of water, on jugular compression to 110 mm., and on final pressure to 60 mm., a total protein of 23 mg. per 100 cc., a negative test for globulin, 1 neutrophil and chloride of 737 mg. per 100 cc.

Physical examination showed complete ptosis of the right eyelid, lateral deviation of the eye and almost complete ophthalmoplegia. The right pupil was dilated and did not react to light or accommodation. Visual acuity, fields and fundi were normal. The left eye was not remarkable. There was no sensory impairment, deviation of the jaw, facial-nerve weakness or impairment of hearing. Speech, palate and tongue were normal. Neurologic examination was otherwise negative. An ear, nose and throat consultant found some bloody mucus on the posterior wall of the right nasopharynx.

The temperature, pulse and respirations were normal. The blood pressure was 120 systolic, 80 diastolic.

The hemoglobin was 13.6 gm., and the white-cell count 10,400, with 74 per cent neutrophils. The urine was negative for Bence–Jones protein. The nonprotein nitrogen was 28 mg., the total protein 6.36 gm., the albumin 4.38 gm., the globulin 1.98 gm., the phosphorus 4.1 mg., and the calcium 10.1 mg. per 100 cc. The blood Hinton test was negative.

Roentgenograms of the skull and sinuses revealed a calvarium of normal contour but rather diffusely vascular. There was increased density in the region of the sphenoid sinuses on the right, and the outline of the floor of the sella turcica was not clearly seen. There appeared to be some calcification in one or both internal carotid arteries near the sella. The bone partitions of the ethmoid sinuses were somewhat hazy.

In the hospital the patient continued to complain of pain. There were no changes in her general or neurologic status. On the eighth hospital day an operation was performed.

Differential Diagnosis

Dr. David G. Cogan: The combination of pain in the face and ptosis suggests rupture of an intracranial aneurysm, but there is no history of hemicranial headaches to go with this diagnosis, and the onset was apparently not sudden. The pain in the tooth may have been a local affair, but the fact that it was right-sided, as was the pain in the face, and chronologically related to the rest of the history, requires that we assume that it had some correlative significance; it may well have been a paresthesia from central involvement of the right fifth nerve. Similarly, the bleeding from the nose and serous discharge may have been a local affair, but the fact that it was unilateral and on the same side as the rest of the patient's symptoms requires that we consider its most serious implication and assume it to have been an ulcerative process with rhinorrhea from a cerebrospinal fistula. I do not know why the discharge should have been most evident in the morning. The negative findings on physical examination of the nose and the negative x-ray findings do not rule out carcinoma of the nasopharynx. We have recently seen a patient with symptoms almost identical to those presented by this patient in whom carcinoma of the nasopharynx was ultimately found, but in the stage comparable to that of this patient no abnormality was found on examination of the nasopharynx or on x-ray examination.

The pain in this patient was more or less continuous and progressive. There was evidently preferential involvement of the second division of the trigeminal nerve. This, together with third-nerve paralysis, points to a lesion behind the superior orbital fissure and lateral to the sella turcica. Pain is not characteristic of benign lesions in this region and, therefore, suggests a malignant tumor extending from the nose into the subarachnoid space.

The spinal-fluid findings were noncontributory, the only thing of interest being the low cerebrospinal-fluid pressure. A reasonable explanation for this would be the cerebrospinal fistula, and it would be interesting to know whether prolonged jugular compression caused an increase in the rhinorrhea. The only noteworthy feature about the third-nerve paralysis is that the pupil was dilated. Lesions immediately behind the superior orbital fissure frequently do not cause enlarged pupils, presumably owing to coincident involvement of the sympathetic pathways. The lesion in this case might be thought, therefore, to have been nearer the cavernous sinus than the superior orbital fissure. It is also noteworthy that the optic nerve was not involved as so frequently happens with the tumors extending from the sphenoidal region. The x-ray films taken after admission showed an increased density in the sphenoid sinuses on the right with obscuration of the floor of the sella turcica. Dr. MacMillan, radiologist at the Massachusetts Eye and Ear Infirmary, tells me that this is compatible with a tumor extending from the sphenoidal region up through the sella turcica. The x-ray finding of calcification in the carotid arteries is not infrequent in people of this age group.

In summary, the patient was a sixty-five-year-old woman whose outstanding symptoms were severe pain in the right trigeminal region and paralysis of the right third nerve. This suggests a lesion lateral to the sella turcica on the right side. The rhinorrhea and x-ray findings are compatible with a tumor connecting the nasopharynx and cranial cavity. It seems to me that the only reasonable diagnosis is an erosive tumor extending either from the nasopharynx or primarily from the sphenoid sinus up into the cranial cavity. The presence of pain and erosiveness points to malignant tumor.

The two predominant types of cancer found in this region are lymphosarcoma and carcinoma. The lymphosarcomas are less apt to cause pain but are more apt to be diffuse, less circumscribed and less erosive. Also, they are frequently characterized by auditory symptoms unlike those produced by carcinoma. This patient therefore appears to have had a carcinoma. On the basis of frequency I would suggest a diagnosis of transitional-cell carcinoma of the sphenoid, with fistula connecting the cranial cavity and nasopharynx.

DR. TRACY B. MALLORY: Are there any questions that you would like to ask Dr. Cogan, or any other suggestions? Perhaps we should see the x-ray films.

DR. JAMES J. MCCORT: The soft-tissue mass overlying the sphenoid sinus can be seen in this region, causing some density of the sphenoid sinus. The posterior wall of the sphenoid sinus appears to be missing. It is probably eroded. On this film the floor of the sella turcica is eroded, with no local identification. There are a few flecks of calcification lying apparently over the sella turcica, which as the protocol says may be in the carotid arteries. There is no curved linear distribution of the calcification, which might indicate aneurysm.

DR. COGAN: Are you able to differentiate a metastatic and a primary lesion?

DR. MCCORT: Not here, since we do not have a complete skull series.

DR. CHARLES I. JOHNSON: I would like to take issue with Dr. Cogan on the fact that the nose and throat specialist was not able to find a carcinoma in the nasopharynx. This was not a nasopharyngeal tumor; it was a sphenoid tumor. With the aid of a nasopharyngoscope a streak of bloody mucus could be seen coming from the ostium of the sphenoid and joining the posterior ethmoid region. There are four ways of examining the nasopharynx: by roentgenograph, mirror, finger and nasopharyngoscope. None of these ways, except x-ray examination and nasopharyngoscope, would have helped in this case. If blood had not been coming out at that instant, the nasopharyngoscope would not have helped. All one would have is the x-ray film. In the presence of suggestive x-ray findings, exploration should be done.

DR. COGAN: The reason I was discounting the negative x-ray examination is that the other patient to whom I referred as having identical symptoms, and who was subsequently found to have a transitional carcinoma of the nasopharynx, also had negative findings in the nose and a negative x-ray examination.

DR. JOHNSON: How long before the tumor was found was the examination done?

DR. COGAN: He was seen by a nose and throat specialist, not by Dr. Johnson, because of recurrent nosebleeds and septal deviation. He had a high blood pressure. Examination of the nasopharynx was negative. He came into the Emergency Ward two months later with a severe epistaxis and was again examined by a nose and throat specialist and the nasopharyngeal tumor was found.

DR. JOHNSON: It means that the patient probably did not have a really good examination the first time.

DR. COGAN: I assumed that the tumor could not be found.

CLINICAL DIAGNOSIS

Transitional cell carcinoma.

DR. COGAN'S DIAGNOSIS

Transitional cell carcinoma of sphenoid sinus.

ANATOMICAL DIAGNOSIS

Transitional cell carcinoma of sphenoid sinus.

PATHOLOGICAL DISCUSSION

DR. JOHNSON: We explored the sphenoid sinus under local anesthesia and took off a good deal of the posterior part of the middle turbinate and removed the anterior face of the sphenoid sinus — removing a mucocele — and then found a large piece of tumor tissue. The superior wall of the sphenoid was gone, according to instrumentation — that is, according to the sensation one gets from instrumentation. We had to be a little careful because we thought there had been a cerebrospinal leak previously. I do not call this a nasopharyngeal tumor; it was a sphenoid tumor, and I do not see how one can possibly miss a nasopharyngeal carcinoma if all four methods of examination are resorted to.

DR. CHARLES S. KUBIK: I have nothing to add to what is in the record. The ocular palsies localize the lesion with great precision, as Dr. Cogan has indicated. In this case it is interesting that although there had been a good deal of pain, there apparently was not enough involvement of the fifth nerve to cause sensory impairment.

DR. MALLORY: The biopsy, as Dr. Johnson said, showed transitional-cell carcinoma, undoubtedly primary in the sphenoid. I believe you saw the patient in reference to treatment, Dr. Taylor.

DR. GRANTLEY W. TAYLOR: My participation in this case was insignificant. The question arose whether or not we could relieve the symptoms. We have had a moderate amount of experience with these tumors. Some are responsive to irradiation — so much so that all symptoms are relieved to a considerable degree. Therefore, we started x-ray therapy, and the results were fairly good. The patient began to get significant relief from symptoms as soon as the treatment was started while she was in the hospital. She had less pain and had some comfort.

DR. JOHNSON: I saw her yesterday. She is more comfortable. The ptosis is complete. Everything else is as it was except that she is more comfortable.

The New England Journal of Medicine

Formerly

The Boston Medical and Surgical Journal

Established 1828

Official Organ of
THE MASSACHUSETTS MEDICAL SOCIETY
and
THE NEW HAMPSHIRE MEDICAL SOCIETY

OWNED BY THE MASSACHUSETTS MEDICAL SOCIETY AND PUBLISHED WEEKLY UNDER THE JURISDICTION OF THE COMMITTEE ON PUBLICATIONS

Richard M. Smith, M.D., *Chairman*
James P. O'Hare, M.D. Conrad Wesselhoeft, M.D.
Oliver Cope, M.D. John Fallon, M.D.

Joseph Garland, M.D., Editor

Associate Editors
Thomas H. Lanman, M.D. Donald Munro, M.D.
Henry Jackson, Jr., M.D.

Clara D. Davies, Executive Editor
Robert O'Leary, Assistant Editor

Editorial Board
C. Guy Lane, M.D. Maxwell Finland, M.D.
Henry R. Viets, M.D. James M. Faulkner, M.D.
Robert M. Green, M.D. Carroll B. Larson, M.D.
Dwight O'Hara, M.D. Francis D. Moore, M.D.
Fletcher H. Colby, M.D. C. Stuart Welch, M.D.
Robert L. Goodale, M.D. Vernon P. Williams, M.D.
Chester M. Jones, M.D. Benjamin Castleman, M.D.
Harvey R. Morrison, M D. Hugh R. Leavell, M.D.

Subscription Terms: $7.00 per year in advance, postage paid, for the United States (medical students, $4.00 per year); Canada, $8.00 per year (Boston funds); $9.50 per year for all foreign countries belonging to the Postal Union.

Material should be received not later than noon on Thursday, three weeks before date of publication.

The Journal does not hold itself responsible for statements made by any contributor.

Communications, *including those concerning classified advertising but not those regarding other advertising*, should be addressed to the *New England Journal of Medicine*, 8 Fenway, Boston 15, Massachusetts. Telephone KE 6-2094.

New England Advertising Representative (*except for classified advertising*): Edwin B. Tyler, 89 State Street, Boston, Massachusetts. Telephone LA 3-5516.

VOX POPULI

THE shouting and the tumult have died away; many of the captains and not a few others have departed. If enough hearts are still humble America has weathered another of her periodic domestic crises, established by her inviolate constitution, and has again emerged as the most democratic nation of any consequence in the world.

This same world of mankind nearly half a century ago entered one of its great revolutionary cycles. Two world wars have been incidents in that cycle and persons of prominence, however important they may have seemed as good or evil influences, have been in many ways little more than symbols of the times in which they have lived. The significant forces have been not emperors or presidents or politicians; not dictators or the champions of democracies, but dissatisfaction with their lot in life, and a great desire to change it, of vast segments of the population. Leaders are but levers that help to put the mass in motion and sometimes try to stop it. Once the reaction has started it usually goes on until its temporary destiny is fulfilled.

America's recent pilgrimage to the polls has shown that in the present instance the voice of the people is not that of the turtle. Patience with slow reforms and half measures is gone. All the countries of the world have turned more or less sharply to the left, and it is inevitable that America should also at least incline in that direction. And where else has government of the people, for the people and by the people a better chance of succeeding?

New experiences will come to this country within the next few years. Labor will have a larger share in government than ever before. Medicine will have to find improved methods of bringing its benefits to all the people if it is still to control its own destiny and escape the sloughs of despond into which it has fallen elsewhere.

The duty of every citizen now is to make a temperate democracy the most successful and the most desirable form of government on earth.

THE MONTH BEFORE CHRISTMAS

THE Christmas Seal Campaign annually calls attention to a widely prevalent disease that, in spite of notable progress in control, accounts for a disheartening number of deaths, many of them avoidable. This year, from November 22 to Christmas Day, the National Tuberculosis Association again conducts its appeal for contributions to a program designed to prevent and control — and eventually to eradicate — tuberculosis. Throughout the land men and women are asked to give what may be regarded as a Christmas present to humanity: the money that provides the sole financial support of the national, state and local associations in their year-round work of control through education, case finding, rehabilitation and medical research.

There is some ground for comfort (but none for complacency) in the fact that since 1904, when the first nationwide, organized campaign against the disease was inaugurated, tuberculosis has declined from first to seventh place among the leading causes of death in the United States. This disease, whose cause is known and for which methods of control and cure are available, still accounts for more deaths than any other disease among people from fifteen to forty-four years of age and still kills 50,000 Americans, including more than 1500 children, each year. A recent increase in the number of new cases in New York City and elsewhere* re-emphasizes the need for constant alertness to the threat of more widespread infection. Careful estimates of 500,000 active cases in the United States are attended by the warning that only half of them are known to health authorities; the remainder of the patients, presumably unaware of their infection and receiving no treatment, provide a reservoir from which the disease is easily spread. Education is thus of primary importance, for if people are made conscious of tuberculosis and its cause and means of prevention, they will more readily take action to protect themselves and their neighbors. The National Tuberculosis Association and more than three thousand affiliated organizations, in co-operation with the United States Public Health Service, state and local health departments, physicians and nurses, work ceaselessly to persuade every person fifteen years of age and over to have regular x-ray examinations of the chest. In thousands of communities the tuberculosis associations and the local health authorities provide mass x-ray services; large groups are examined quickly and at low cost, and in many sections the service is free. This program is based on a sound principle of preventive medicine: no complete control is possible until the unknown cases, which provide the source of infection, are recognized and the patients treated.

No endeavor to alleviate suffering remains unsupported by Americans. Each year, on the eve of the season of rejoicing and good will among men, their generous response to this appeal represents the conviction that man, in many ways, is his brother's keeper. As a symbol of a united effort of relief and protection for the unfortunate, the Christmas Seal has fulfilled its office, justifying the sentiment expressed in the lofty phrases of a great poet and divine of the sixteenth and seventeenth centuries: "Any mans death diminishes me, because I am involved in Mankinde."

*Editorial. Increase in tuberculosis. *New Eng. J. Med.* 239:796, 1948.

PENICILLIN FOR PROPHYLAXIS

THE prophylactic use of penicillin is receiving an increasing degree of attention. The drug is almost universally employed before and after tooth extractions or other dental manipulations, particularly in patients who are considered to be susceptible to bacterial endocarditis.[1] By the same token, penicillin is given liberally in the treatment or prevention of mild respiratory infections in patients who have had rheumatic fever[2] or in whom subacute bacterial endocarditis has been arrested or cured by penicillin therapy.[3] The administration of penicillin during severe influenza-virus infections or in certain cases of extensive viral pneumonia may also prove useful in preventing the occurrence or spread of bacterial complications. Penicillin has also been used both with and without influenza-virus vaccine in the prophylaxis of upper respiratory infections.[4, 5]

The use of penicillin in the prophylaxis of venereal infections is an obvious corollary to its use in the treatment of these diseases. It is well to bear in mind that although relatively small doses of penicillin are adequate in the prevention of syphilitic infection in the rabbit,[6-8] the use of penicillin in the small doses that are effective in the treatment of simple gonococcal urethritis has been followed, in a number of reported cases, by the development of syphilis from what probably was the same exposure.[9]

A preliminary trial of the use of penicillin tablets for the prevention of gonorrhea[10] has nevertheless yielded encouraging results from the point of view of reducing the incidence of this infection. In the controlled but brief study thus far recorded there has been no evidence of sensitization to penicillin, no apparent development of penicillin-fast strains of gonococci and no recognized instance of suppressed syphilitic infection. Further reports of

this and other studies will, of course, be awaited with interest.

Some observations have already been made also on the administration of oral penicillin instead of sulfonamides for the prevention of recurrences in cases of rheumatic fever.[2, 11] It is too soon to evaluate the results in these cases. The potential complications of the widespread use of penicillin and particularly the potentialities of producing and disseminating resistant strains by continuous prophylaxis with this antibiotic are as yet unknown. The report[11] of the discovery of highly resistant strains of streptococci in children after they had received penicillin prophylactically by mouth for some time is rather disturbing. The data in this regard, however, are inadequate for proper evaluation and require confirmation, particularly in view of the fact that these resistant strains have subsequently been eliminated from the same patients by the use of larger oral doses of penicillin and also because the development of resistant strains of hemolytic streptococci has not yet been encountered during treatment of active infections by any other observers.

References

1. Glaser, R. J., Dankner, A., Mathes, S. B., and Harford, C. G. Effect of penicillin on bacteremia following dental extraction. *Am. J. Med.* **4**:55-65, 1948.
2. Maliner, M. M., and Amsterdam, S. D. Oral penicillin in prophylaxis of recurrent rheumatic fever. *J. Pediat.* **31**:658-661, 1947.
3. Tumulty, P. A., and Harvey, A. McG. Experiences in management of subacute bacterial endocarditis treated with penicillin. *Am J. Med.* **4**:37-54, 1948.
4. Lapin, J. H. Prophylaxis of upper respiratory infections in children by oral penicillin and influenza virus vaccine inoculation. *Arch. Pediat.* **64**:121-131, 1947.
5. *Idem.* Prophylaxis of upper respiratory infections in children treated with oral penicillin. *J. Pediat.* **32**:119-124, 1948.
6. Eagle, H., Magnuson, H. J., and Fleischman, R. Relation of size of inoculum and age of infection to curative dose of penicillin in experimental syphilis, with particular reference to feasibility of its prophylactic use. *J. Exper. Med.* **85**:423-440, 1947.
7. Rake, G., Dunham, W. B., and Donovick, R. Evaluation of antibiotics by prevention of experimental syphilis. *J. Infect. Dis.* **81**: 122-129, 1947.
8. Eagle, H., and Fleischman, R. Relative antisyphilitic activity of penicillins F, G, K, and X and of bacitracin, based on amounts required to abort early syphilitic infections in rabbits. *J. Bact.* **55**: 341-346, 1948.
9. Meads, M., and Finland, M. Penicillin in treatment of gonococcal infections: analysis of results reported in literature through 1945. *Am. J. Syph., Gonor. & Ven. Dis.* **30**:586-609, 1946.
10. Eagle, H., et al. Prevention of gonorrhea with penicillin tablets: preliminary report. *Pub. Health Rep.* **63**:1411-1415, 1948.
11. Milzer, A., Kohn, K. H., and MacLean, H. Oral prophylaxis of rheumatic fever with penicillin: resistant hemolytic streptococci. *J. A. M. A.* **136**:536-538, 1948.

ROSTER OF PHYSICIANS

According to the Bureau of Medical Economic Research of the American Medical Association, there were approximately 199,755 living physicians in the United States on June 1, 1948. The Bureau for over a year has been developing a punch-card system of tabulating physicians, and hopes to have the roster completed early in 1949.

The most populous state so far as physicians is concerned is New York, with 30,970. Nevada, with 198 has the fewest. Massachusetts stands sixth in line with 9102, of whom approximately two thirds are fellows of the Massachusetts Medical Society.

The 3000 who are not fellow members should be our grave concern. Those who are eligible for fellowship should be urged to apply. Those who are not now eligible but are capable of becoming so should be encouraged to improve their standing in the profession and should be given all possible assistance in making the effort.

Fourth-year students in approved medical schools are reminded of the *Journal's* prize essay competition on preventive medicine.

For further information see *The New England Journal of Medicine*, September 30, 1948, p. 525, or write to the editor.

MASSACHUSETTS MEDICAL SOCIETY

DEATHS

Barnes — Henry Barnes, M.D., of New Bedford, died on May 29. He was in his seventy-first year.

Dr. Barnes received his degree from Columbia University College of Physicians and Surgeons in 1903. He was chief of staff at Acushnet Hospital and a fellow of the American Medical Association.

Glassman — Nathan B. Glassman, M.D., of Boston, died on June 8. He was in his fifty-ninth year.

Dr. Glassman received his degree from College of Physicians and Surgeons, Boston, in 1916. He was a fellow of the American Medical Association.

His widow, a son and a daughter survive.

Mailey — H. Douglas Mailey, M.D., formerly of Andover, died on October 14. He was in his thirty-fourth year.

Dr. Mailey received his degree from Boston University School of Medicine in 1942. He was formerly radiologist at the Lahey Clinic.

His widow, a son, a daughter, his father and two sisters survive.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

PREMARITAL AND PRENATAL BLOOD TESTS

Hospital administrators and laboratory directors are informed that it has been brought to the attention of the Department that laboratories not approved for performing premarital and prenatal blood tests have been accepting specimens from physicians to be examined for this purpose. They are requested to call to the attention of laboratory personnel that this practice is contrary to law. If a laboratory does not appear among those in the following list, physicians should be told that all specimens should go to a laboratory that has approval for doing these tests:

Location	Laboratory
Boston	Boston Dispensary
	Boston Health Department
	Commonwealth Clinical Laboratory
	Leary Laboratory
	Massachusetts General Hospital
	Massachusetts Memorial Hospitals (Genitoinfectious Disease Clinic)
	State Wassermann Laboratory
Brockton	Brockton Health Department
Brookline	Sias Laboratory (Brooks Hospital)
Clinton	Clinton Hospital
Fall River	Union Hospital
Fitchburg	Burbank Hospital
Great Barrington	Fairview Hospital
Holyoke	Holyoke Hospital
	Providence Hospital
Lowell	Lowell General Hospital
Montague City	Farren Memorial Hospital
New Bedford	Clinical Laboratory
	St. Luke's Hospital
Newton	Newton–Wellesley Hospital
North Adams	North Adams Hospital
Pittsfield	St. Luke's Hospital
	House of Mercy Hospital
Salem	Salem Hospital
Springfield	Mercy Hospital
Tewksbury	State Infirmary and Hospital
Westfield	Noble Hospital
Worcester	St. Vincent Hospital
	Worcester City Hospital
	Worcester Health Department

Attention is called to the fact that laboratories that have approval for doing rapid blood Hinton tests for transfusions only are not recognized as qualified to perform premarital and prenatal blood tests.

If a laboratory wishes to be added to the attached list, it should seek approval of the Department for a diagnostic serologic test for syphilis.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS

The December schedule for Consultation Clinics for Crippled Children in Massachusetts under the provisions of the Social Security Act follows:

Clinic	Date	Clinic Consultant
Haverhill	December 1	William T. Green
Lowell	December 3	Albert H. Brewster
Salem	December 6	Paul W. Hugenberger
Brockton	December 9	George W. Van Gorder
Greenfield	December 13	Charles L. Sturdevant
Gardner	December 14	Carter R. Rowe
Pittsfield	December 15	Frank A. Slowick
Worcester	December 17	John W. O'Meara
Springfield	December 21	Garry deN. Hough, Jr.
Hyannis	December 23	Paul L. Norton
Fall River	December 27	David S. Grice

Physicians referring new patients to clinics should get in touch with the district health officer to make appointments. Patients are seen by appointment only.

MISCELLANY

MASSACHUSETTS DEPARTMENT OF EDUCATION, DIVISION OF VOCATIONAL REHABILITATION

Handicapped persons can be helped by the Division of Vocational Rehabilitation, Massachusetts Department of Education, 200 Newbury Street, Boston. The aim of this division is to improve "the physical, mental, social, vocational and economic usefulness" of all handicapped persons who are over sixteen years of age and who have a mental or physical disability that is a substantial employment handicap. This division may furnish to eligible clients counseling, guidance, training in occupations, refresher training and placement.

The medical or surgical treatment for physical or mental handicaps that are static and may be removed or appreciably alleviated within a reasonable period may be purchased by this division. These services are available to those in economic need and are paid on a fee-for-service basis to physicians, surgeons, physiatrists and other medical agencies *of the patient's choice.*

For example, through this division crippled persons may be furnished appliances or taught sedentary trades or both. Cardiac patients may learn lighter trades. Needy ruptured persons may have surgical care. Amputees may be provided with artificial limbs.

It is hoped that the recent increase in the all-inclusive per-diem allowance by this division to hospitals servicing its clients will increase the number of co-operating hospitals, making the services more readily available. The all-inclusive per-diem allowance has been increased to $10 as of October 1, 1948, in hospitals whose per-diem costs per patient are $10 or over.

The division will be pleased to furnish further information to patients, physicians, hospitals or other agencies concerning this program of vocational rehabilitation and physical restoration.

CORRESPONDENCE

DEPRIVATION OF LICENSES

To the Editor: At the meeting of the Board of Registration in Medicine held October 21, it was voted to suspend for six months the registration of Dr. Glenn F. Muntz, 30 Huntington Avenue, Boston, and to revoke the registration of Dr. R. Reyes Garcia, 1562 Main Street, Springfield.

George L. Schadt, M.D., *Secretary*
Board of Registration in Medicine
State House
Boston

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

History of the Medical Society of the County of Westchester, 1797-1947: A compilation from the available minutes of the Society and various contemporary sources during the years for which the minutes were lost. 12°, cloth, 193 pp. New York: Medical Society of the County of Westchester, 1947. $2.50.

This history of a county medical society of New York has been compiled by the current historian, Dr. Laurance D. Redway, from the available minutes of the Society and contemporary sources. The Society was founded in 1797 and has had a continuous existence until the present time. The text is concluded with two short historical sketches of the Department of Public Welfare of the County, and of the Westchester Nursing Association. The book is privately printed. The lack of an index detracts from its reference value.

The Care and Management of Laboratory Animals: Handbook of the Universities Federation for Animal Welfare. With an appendix on statistical analysis. By Alastair N. Woden, M.A. (Cantab.), B.Sc. (Lond.), M.R.C.V.S., A.R.I.C., Milford Professor and director of research in animal health, University College of Wales, Aberystwyth. With a foreword by Professor T. Dalling, M.A., M.R.C.V.S., F.R.S.E., director, Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, Surrey. 8°, cloth, 376 pp., with 70 illustrations. Baltimore: Williams and Wilkins Company, 1947. $8.50.

This handbook, the composite work of a number of experts in animal husbandry, has been produced under the sponsorship of the Universities Federation for Animal Welfare, London. The first three chapters deal with law and practice and the laboratory rights of the animal; the animal laboratory, its construction and maintenance; and the pests of the animal house and their control. The following chapters are devoted to the care and handling of animals used in laboratory work and their diseases. Separate chapters are given to 19 different small animals, birds, amphibia and fresh-water fish. An appendix comprises a technical conspectus of the elements of statistical analysis. A selected list of references is appended to each chapter. Indexes of subjects and authors are appended to the text. The volume is well published in every way. This exceptional handbook has long been needed and is an essential reference work. It should be in all libraries, general and medical, and in all laboratories where animals are kept for research, control and production purposes. Likewise, it should prove valuable to all persons handling small animals.

Manual for Laboratory Work in Mammalian Physiology. By Fred E. D'Amour and Frank R. Blood. 8°, paper, 162 pp., with 207 illustrations. Chicago: University of Chicago Press, 1948. $2.75.

This manual is based on a group of fifty experiments in which the rat is used exclusively. It is hoped that the use of this convenient animal will greatly simplify the problem of laboratory animal supply. The materials and equipment and procedure for each experiment are simply described and illustrated. The use of anesthesia in the experiments is stressed. The binding is the ring-type. The text is well printed. The manual should prove valuable to students in physiology.

Neuroanatomy. By Fred A. Mettler, A.M., M.D., Ph.D., associate professor of anatomy, College of Physicians and Surgeons, Columbia University. Second edition. 4°, cloth, 536 pp., with 357 illustrations, including 33 in color. St. Louis: The C. V. Mosby Company, 1948. $10.00.

This second edition of a standard textbook has been revised considerably, and material on the blood supply and venous drainage of the various portions of the neuraxis has been added. The volume is well published in every way and is an essential book for all medical libraries and for neurologists and neurosurgeons.

NOTICES

ANNOUNCEMENTS

Dr. William L. Davis announces the opening of his office for the general practice of medicine at 262 Beacon Street, Boston.

Dr. Elliot L. Sagall announces the removal of his office for the practice of internal medicine to 371 Commonwealth Avenue, Boston.

MOUNT AUBURN HOSPITAL TUMOR CLINIC

A tumor clinic has been established at Mount Auburn Hospital, 330 Mt. Auburn Street, Cambridge. The clinics are held on Fridays at 1:30 p.m. in the Out-Patient Department.

The services of the clinic are available to private patients on a consultative basis. Patients are seen by appointment only. An abstract of the referring physician's findings should accompany the patient.

At the clinic an examination will be made calling in the necessary consultants in various specialties. After examination a group opinion will be given.

A letter stating the results of the examination and the opinion will be sent to the physician. The patient will be directed to return to him.

The fee for this examination and opinion will be $10.00.

If special examinations, biopsy, laboratory, x-ray, endoscopy and so forth are thought necessary, the referring physician will be notified.

Appointments can be made by telephone (TRowbridge 6-5680, Extension 219).

MASSACHUSETTS GENERAL HOSPITAL RESEARCH COUNCIL

A meeting of the Massachusetts General Hospital Research Council will be held in the Bigelow Amphitheater on Wednesday, December 1, at 4:30 p.m.

PROGRAM

The Effects of Experimental Potassium Deficiency. Lytt I. Gardner, Charles D. Cook, Helen Berman, Elsie A. Maclachlan and Nathan B. Talbot (twenty minutes).

Recent Developments in the Study of the Metabolic Functions of the B Vitamins. Nathan O. Kaplan (twenty minutes).

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held on Thursday, December 2, at 7:15 p.m., in the classroom of the Nurses' Residence. Dr. Harold H. Rosenfield will discuss the subject "Some Abnormalities of the Third Stage of Labor: Presentation of cases." Dr. Mabelle C. Hiscock will be chairman.

NEW ENGLAND HEART ASSOCIATION

A meeting of the New England Heart Association will be held at the Massachusetts General Hospital on Monday, December 6, at 8:15 p.m., Dr. Paul D. White presiding.

PROGRAM

Syphilitic Aortic Regurgitation: A follow-up study of 100 cases. Drs. James H. Currens and William R. Hill.

A Venous Shunt for Marked Mitral Stenosis. Drs. Edward F. Bland and Richard H. Sweet.

Prognosis in Essential Hypertension: Eight-year follow-up of 430 cases. Drs. Robert S. Palmer, Dorothea Loofbourow and Carl Doring.

Effect of Skin Resistance in Relation to the Newer Electrocardiographic Leads. Dr. Hsuch-hwa Wang, Mr. Maurice Rappaport and Dr. Conger Williams.

Physique in the Young Coronary Patient. Drs. Stanley Garn and Menard M. Gertler.

The National Heart Institute. Dr. Paul D. White.

Interested physicians and medical students are cordially invited to attend.

NEW ENGLAND SOCIETY OF ANESTHESIOLOGISTS

A meeting of The New England Society of Anesthesiologists will be held in the auditorium of Building A, Boston University School of Medicine, 80 East Concord Street, Boston, on Tuesday, December 14, at 8:00 p.m. The program will include the following reports on medical missions to Europe:

Mission to Germany. Dr. Henry K. Beecher.

Mission to Poland. Dr. Meyer Saklad.

Physicians and medical students are invited to all meetings.

(*Notices concluded on page xv*)